
National Park Service
Cultural Landscapes Inventory

2009



Civilian Conservation Corps Haleakala Crater Trails
District
Haleakala National Park



**Civilian Conservation Corps Haleakala Crater
Trails District
Haleakala National Park**

Haleakala National Park concurs with the findings of the CLI, including the management category and condition assessment as identified below:

MANAGEMENT CATEGORY: **B: Should be preserved and maintained**

CONDITION ASSESSMENT: **Fair**

A handwritten signature in dark ink, appearing to read "M. David C. Shaw", is written over a horizontal line.

Superintendent, Haleakala National Park

4-28-09

Date

Please return to:

Vida Germano
Cultural Landscape Inventory Coordinator
National Park Service
Pacific West Regional Office
1111 Jackson Street, Suite 700
Oakland, CA 94607-4807

September 14, 2009

HALEAKALA NATIONAL PARK

Civilian Conservation Corps Haleakala Crater Trails District

Hawaii SHPO Consensus Determination of Eligibility

Actions Requested:

1) SHPO concurrence on the eligibility of the Civilian Conservation Corps Haleakala Crater Trails District for the National Register of Historic Places:

 X I concur, I do not concur with the eligibility of the Civilian Conservation Corps Haleakala Crater Trails District as described in the CLI.

2) SHPO concurrence that the landscape characteristics as identified in the CLI contribute to the historic character of the Civilian Conservation Corps Haleakala Crater Trails District (see the following landscape characteristic descriptions in the Analysis and Evaluation section of the CLI: Natural Systems and Features, Spatial Organization, Land Use, Buildings and Structures, Circulation, Topography, and Views and Vistas):

I concur X , I do not concur that the landscape characteristics as described in the CLI contribute to the historic character of the Civilian Conservation Corps Haleakala Crater Trails District.

3) SHPO concurrence with the list of contributing and non-contributing structures to the Civilian Conservation Corps Haleakala Crater Trails District. (See tables below and the following landscape characteristic descriptions in the Analysis and Evaluation section of the CLI: Buildings and Structures; and Circulation):

Contributing Structures: Based on the information provided in the CLI, the following structures have been identified as contributing features of the Civilian Conservation Corps Haleakala Crater Trails District:

Contributing Structure Name	Date Built	Concur	Do not Concur
Holua Cabin	1937	Hawaii SHPO Concurrence with DOE on 10/24/1997	
Holua Water Tanks (2)	1937		
Kapalaoa Cabin	1937		
Kapalaoa Water System (4)	1937		
Paliku Patrol Cabin	1937		
Paliku Cabin	1937		
Paliku Footbridge	1937		
Paliku Water Tanks (2)	1937		
Sliding Sands Trail (Keonehe'ehe'e)	1930-1941		
Halemau'u Trail	1930-1941		

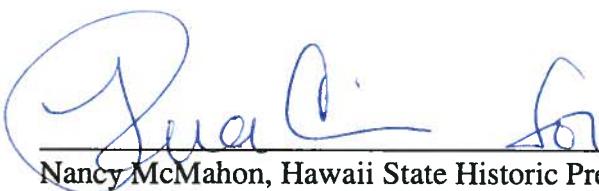
Contributing Structure Name	Date Built	Concur	Do not Concur
Causeways (24)	1930-1941	X	
Check Steps (77)	1930-1941	X	
Water Bars or Check Dams (26)	1930-1941	X	
Edging (8)	1930-1941	X	
Retaining Walls (194)	1930-1941	X	
Kaupo Trail	1930-1941	X	
Horse Hitch Trail (Ka Moa O Pele)	1930-1941	X	
Halali'i Cinder Cone Trail	1930-1941	X	
Central Crater "Y" Trail (Bubble Cave)	1930-1941	X	
Paliku Access Trail	1930-1941	X	

Non-contributing Structures: Based on the information provided in the CLI, the following structures have been identified as non-contributing features of the NPS-owned portion of the Haleakala Highway:

Non-contributing Structure Name	Date Built	Concur	Do Not Concur
Holua Rear Storage Shed	1990	X	
Holua Horse Hitches (3)	Post 1941	X	
Holua "Hilton" Corral	Post 1941	X	
Holua "Hilton" Shed	1962	X	
Holua Pit Toilets (3)	Post 1941, 2001	X	
Holua Water Spigot	1980s	X	
Holua Wilderness Campground	1970s	X	
Kapalaoa Water Tank Platform	1930s, remnant	X	
Kapalaoa Rear Storage Shed	1962	X	
Kapalaoa Pit Toilet	2001	X	
Kapalaoa Horse Hitches (2)	1948	X	
Kapalaoa Wood Plank Retaining Wall	1990s	X	
Paliku Water Tank	1970s	X	
Paliku Stable	1962	X	
Paliku Metal Shed	1962	X	
Paliku Pit Toilets (2)	2000	X	
Paliku Horse Hitches (2)	1948	X	
Paliku Patrol Cabin Corral	Post-1941	X	
Paliku Water Spigot	1980s	X	
Paliku Wilderness Campground	1970s	X	
Check Steps (1193)	Post-1941	X	
Water Bars or Check Dams (179)	Post-1941	X	
Edging (32)	Post-1941	X	
Rip Rap Trail Tread	Post-1941	X	
Retaining Walls (3)	Post-1941	X	
Halemau'u Open Culverts (11)	Post-1941	X	
Halemau'u Gutters (4)	Post-1941	X	
Halemau'u Steel Culverts (3)	Post-1941	X	

Non-contributing Structure Name	Date Built	Concur	Do Not Concur
Halemau'u Horse Hitch	Post-1941	X	
Halemau'u Gate	Post-1941	X	
Sliding Sands Horse Hitch	Post-1941	X	
Holua Developed Area Campground Access Trail	1970s, altered 1980s	X	
Social Trails	Post-1941	X	
Short Cut Trail (Pa Puua O Pele)	Post-1941	X	
Crater Trail System Signs	Post-1941	X	

Reasons/comments why any 'Do Not Concur' blocks were checked:



Nancy McMahon, Hawaii State Historic Preservation Officer

9/14/09

Date

Please return forms to the attention of:
Elizabeth Gordon
Cultural Resources Program Manager
Haleakala National Park
P.O. Box 369
Makawao, HI 96768

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Inventory Unit Summary & Site Plan

Inventory Summary

The Cultural Landscapes Inventory Overview:

CLI General Information:

Cultural Landscapes Inventory – General Information

The Cultural Landscapes Inventory (CLI) is a database containing information on the historically significant landscapes within the National Park System. This evaluated inventory identifies and documents each landscape's location, size, physical development, condition, landscape characteristics, character-defining features, as well as other valuable information useful to park management. Cultural landscapes become approved inventory records when all required data fields are entered, the park superintendent concurs with the information, and the landscape is determined eligible for the National Register of Historic Places through a consultation process or is otherwise managed as a cultural resource through a public planning process.

The CLI, like the List of Classified Structures (LCS), assists the National Park Service (NPS) in its efforts to fulfill the identification and management requirements associated with Section 110(a) of the National Historic Preservation Act, National Park Service Management Policies (2001), and Director's Order #28: Cultural Resource Management. Since launching the CLI nationwide, the NPS, in response to the Government Performance and Results Act (GPRA), is required to report information that respond to NPS strategic plan accomplishments. Two goals are associated with the CLI: 1) increasing the number of certified cultural landscapes (1b2B); and 2) bringing certified cultural landscapes into good condition (1a7). The CLI maintained by Park Historic Structures and Cultural Landscapes Program, WASO, is the official source of cultural landscape information.

Implementation of the CLI is coordinated and approved at the regional level. Each region annually updates a strategic plan that prioritizes work based on a variety of park and regional needs that include planning and construction projects or associated compliance requirements that lack cultural landscape documentation. When the inventory unit record is complete and concurrence with the findings is obtained from the superintendent and the State Historic Preservation Office, the regional CLI coordinator certifies the record and transmits it to the national CLI Coordinator for approval. Only records approved by the national CLI coordinator are included on the CLI for official reporting purposes.

Relationship between the CLI and a Cultural Landscape Report (CLR)

The CLI and the CLR are related efforts in the sense that both document the history,

significance, and integrity of park cultural landscapes. However, the scope of the CLI is limited by the need to achieve concurrence with the park superintendent resolve eligibility questions when a National Register nomination does not exist or the nomination inadequately addresses the eligibility of the landscape characteristics. Ideally, a park's CLI work (which many include multiple inventory units) precedes a CLR because the baseline information in the CLI not only assists with priority setting when more than one CLR is needed it also assists with determining more accurate scopes of work.

In contrast, the CLR is the primary treatment document for significant park landscapes. It, therefore, requires an additional level of research and documentation both to evaluate the historic and the existing condition of the landscape in order to recommend preservation treatment that meets the Secretary of Interior's Standards for the treatment of historic properties.

The scope of work for a CLR, when the CLI has not been done, should include production of the CLI record. Depending on its age and scope, existing CLR's are considered the primary source for the history, statement of significance, and descriptions of contributing resources that are necessary to complete a CLI record.

Inventory Unit Description:

The Civilian Conservation Corps (CCC) Haleakala Crater Trails District is located in Haleakala Crater in the center of Haleakala National Park. The trail system was designed by National Park Service landscape architects and constructed and/or improved by CCC enrollees between 1930 and 1941 to encourage visitor access into the crater by foot, instead of vehicle. The boundary of the proposed district includes a 20-foot wide corridor that follows the length of the trail system. The corridor is measured ten feet from the centerline of the trails, which widens as necessary to include built features such as retaining walls and developed areas.

Located at the summit of a massive 10,000-foot dormant shield volcano, Haleakala Crater is a 3,000-foot deep depression, measuring approximately 7.5 miles by 2.5 miles wide. Defined by its rich volcanic history, cinder cones and dark courses of lava rock serve as reminders of past eruptions. Today, the western half of the crater is covered by lava flows and cinder desert, while the eastern edge of the crater is lush, with remnants of a native forest still in existence. The most prominent natural feature includes a series of cinder cones, which run in a line up to the summit and down over the crest occupying central and western portions of the crater.

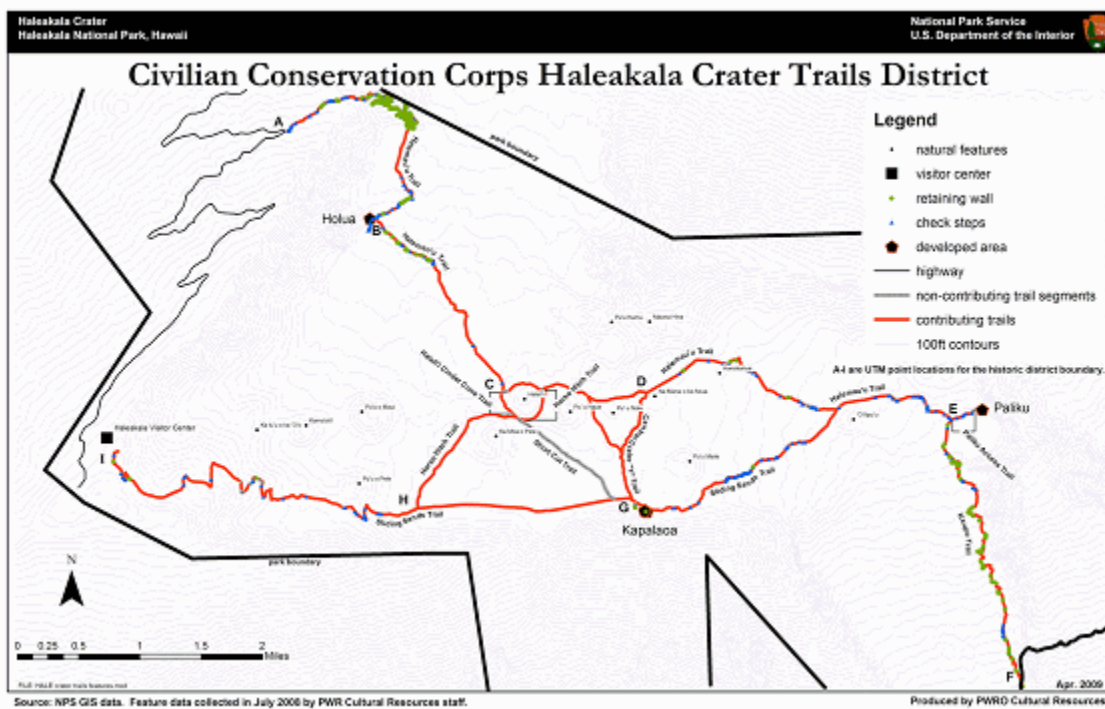
Largely composed of designated wilderness, the crater includes a well established historic trail system and several discreet areas of development. The 26.5-mile-long historic district includes 24.7 miles of contributing historic trails and 1.8 miles of non-contributing trails, which provide visitor access to three historic developed areas in the crater. These developed areas include: 1) Holua, located in the northwest portion of the crater at the foot of the towering, 3,000-foot Leleiwi Pali; 2) Kapalaoa, located in the southern reaches of the crater and; 3) Paliku, defined by lush grass and ferns, overhanging forest trees, and a verdant cover located in the eastern extent of the crater. All three areas include rustic cabins and water tanks as well as contemporary picnic tables and pit toilet facilities. In addition to cabins, wilderness campgrounds are also located at Holua and Paliku.

The CCC Haleakala Crater Trails District is significant under Criterion A for its association with early park master planning as implemented by NPS and CCC labor crews, and under Criterion C for its association with park service rustic style. The period of significance begins in 1930 with the initial construction of the crater trail system and extends to 1941 when CCC work on the trails ended. Following rustic design principles, the trails and associated developed areas were designed to highlight crater views and associated volcanic features, while effortlessly blending with the natural environment. The depth of consideration put into the design is evident in trail width, gradient, alignment and use of native stone materials used in construction of buildings and structures, which contribute to the rustic-character of the district.

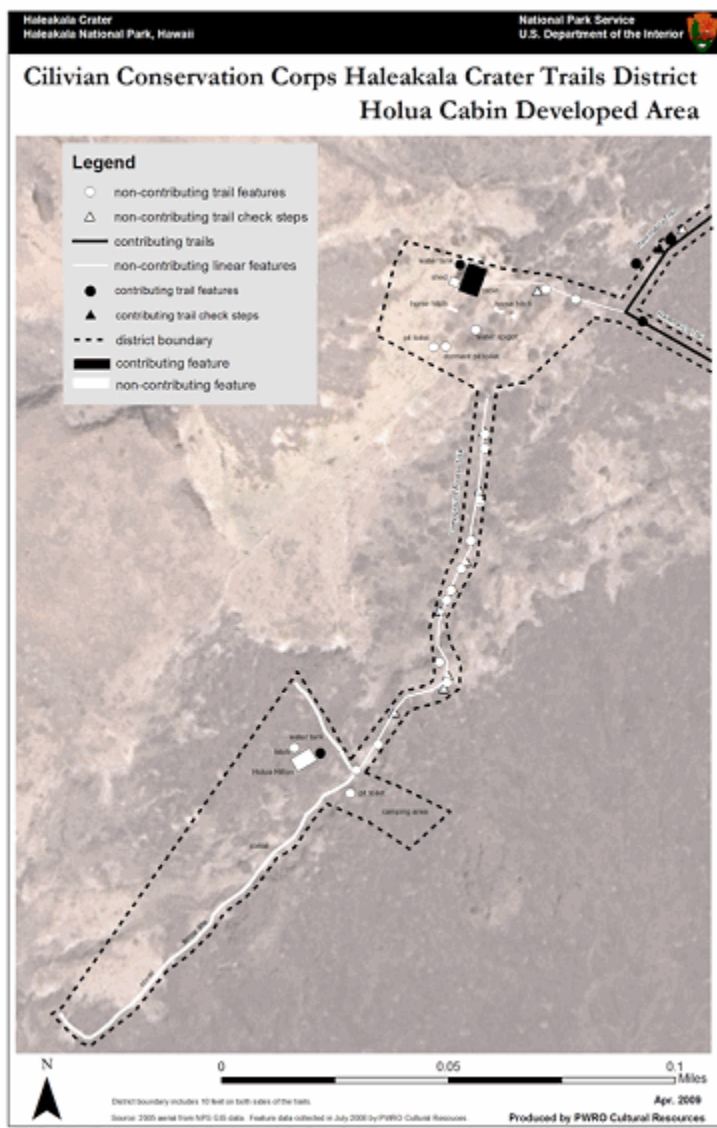
Principal landscape characteristics of the CCC Haleakala Crater Trails District include natural systems and features, spatial organization, land use, buildings and structures, circulation, topography, and views and vistas. Collectively, these landscape characteristics and their associated features serve as an excellent example of development within the context of park master planning and rustic design of the 1930s. While small components of the district have changed as a result of the dynamic nature of the landscape, the key characteristics that historically defined the historic trail system and developed areas retain all seven aspects of integrity including the location, design, setting, materials, workmanship, feeling and association. Furthermore, the trail system and its associated features continue to be used as was originally intended—providing visitor access and accommodation to the largely undeveloped interior of Haleakala Crater.

The CCC Haleakala Crater Trails District retains its historic character allowing the district to convey its significance on the local level as a planned rustic-style development. The district is in fair condition.

Site Plan

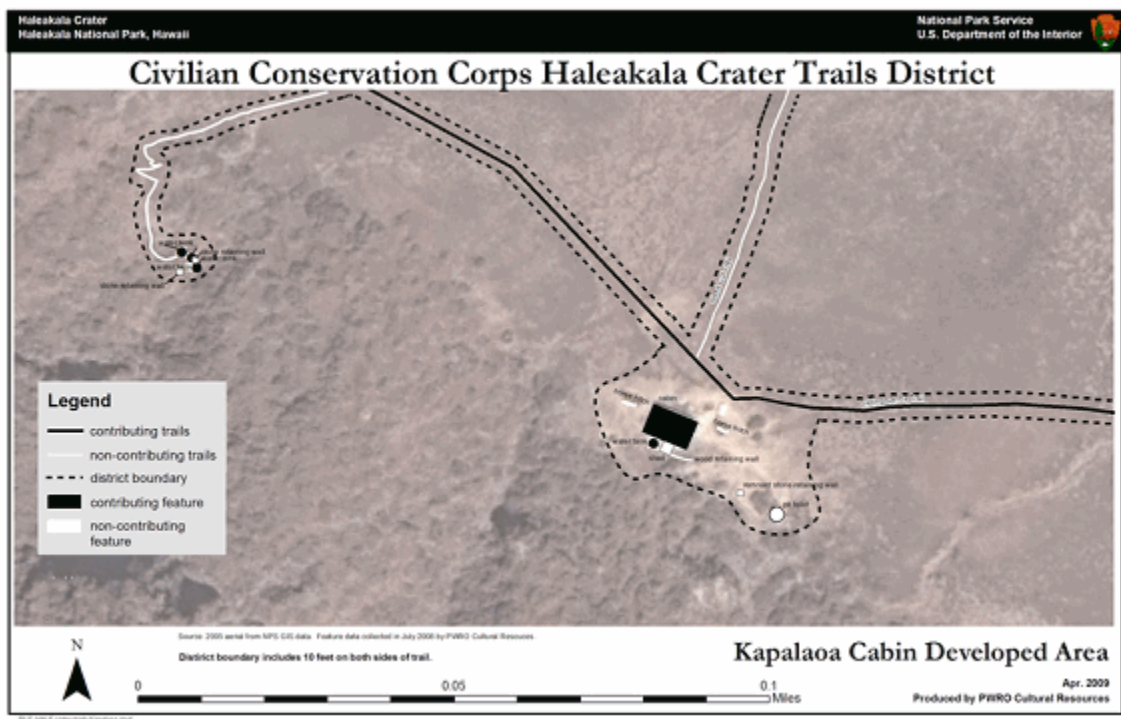


For a larger version of this site plan see “Supplemental Information.”

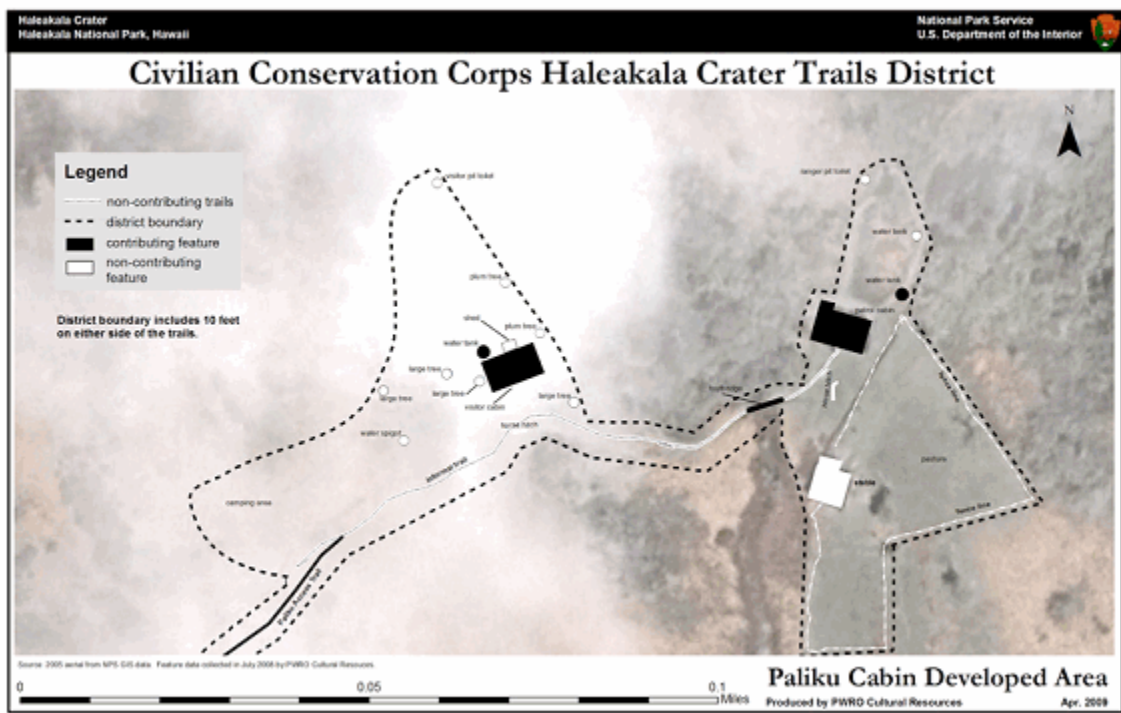


For a larger version of this site plan see “Supplemental Information.”

Civilian Conservation Corps Haleakala Crater Trails District
Haleakala National Park



For a larger version of this site plan see “Supplemental Information.”



For a larger version of this site plan see “Supplemental Information.”

Property Level and CLI Numbers

Inventory Unit Name:	Civilian Conservation Corps Haleakala Crater Trails District
Property Level:	Landscape
CLI Identification Number:	975494

Park Information

Park Name and Alpha Code:	Haleakala National Park -HALE
Park Organization Code:	8290
Park Administrative Unit:	Haleakala National Park

Concurrence Status

Inventory Status: Complete

Completion Status Explanatory Narrative:

Fieldwork was conducted in July 2008 by Jason Biscombe and Cortney Cain. Vida Germano performed historical research in September 2008. The report was written and prepared by Vida Germano and Cortney Cain.

Concurrence Status:

Park Superintendent Concurrence:	Yes
Park Superintendent Date of Concurrence:	04/28/2009
National Register Concurrence:	Eligible -- SHPO Consensus Determination
Date of Concurrence Determination:	09/14/2009

Geographic Information & Location Map

Inventory Unit Boundary Description:

The Civilian Conservation Corps Haleakala Crater Trails District boundary includes a 20-foot wide corridor along 26.5 miles of the 30-mile-long crater trail system. The corridor is measured 10 feet from the centerline of the trails and is wider in places to include built features such as retaining walls and ditches along the trails and the entirety of the three cabin developed areas along the trails. The boundary includes all of the major trails within the Haleakala Crater including the three primary trails named Halemā'u, Sliding Sands (also known as Keonehe'ehe'e), and Kaupo Trails and a series of short trails along the crater floor that provide connections to these main trails. The Halemā'u trailhead is located at the northwest rim of the crater at 7,990 feet in elevation, just off the Haleakala Highway. The Sliding Sands trailhead is located at the southwest rim of the crater at 9,778 feet in elevation, just off the Haleakala Highway in the vicinity of the Haleakala Visitor Center. Both the Halemā'u Trail and Sliding Sands converge at the east side of the crater at 'O'ilipu'u (cinder cone). The Kaupo Trail connects to the east end of Halemā'u Trail at Paliku and extends south outside the crater and becomes the Kaupo Ranch 4-wheel-drive road outside of the park boundary. The historic district boundary branches off the trail corridor to include the following developed areas: Kapalāoa Cabin, Paliku Visitor Cabin and Patrol Cabin, and Holua Cabin.

Boundary Justification

The boundary includes all major trails within the crater identified as contributing features within this document and any associated built features. Secondary crater trails may be added at a later time pending further research and concurrence by the SHPO regarding their eligibility. Only a portion of the Kaupo Trail is included in the historic district boundary because the historic district encompasses only the crater trails within the park boundary.

Three developed areas within the crater at Kapalāoa, Paliku, and Holua are included in the boundary because they are a part of the history of the development of the crater trails.

See the Location Map for the UTM points that demarcate the trail system boundary.

State and County:

State: HI

County: Maui County

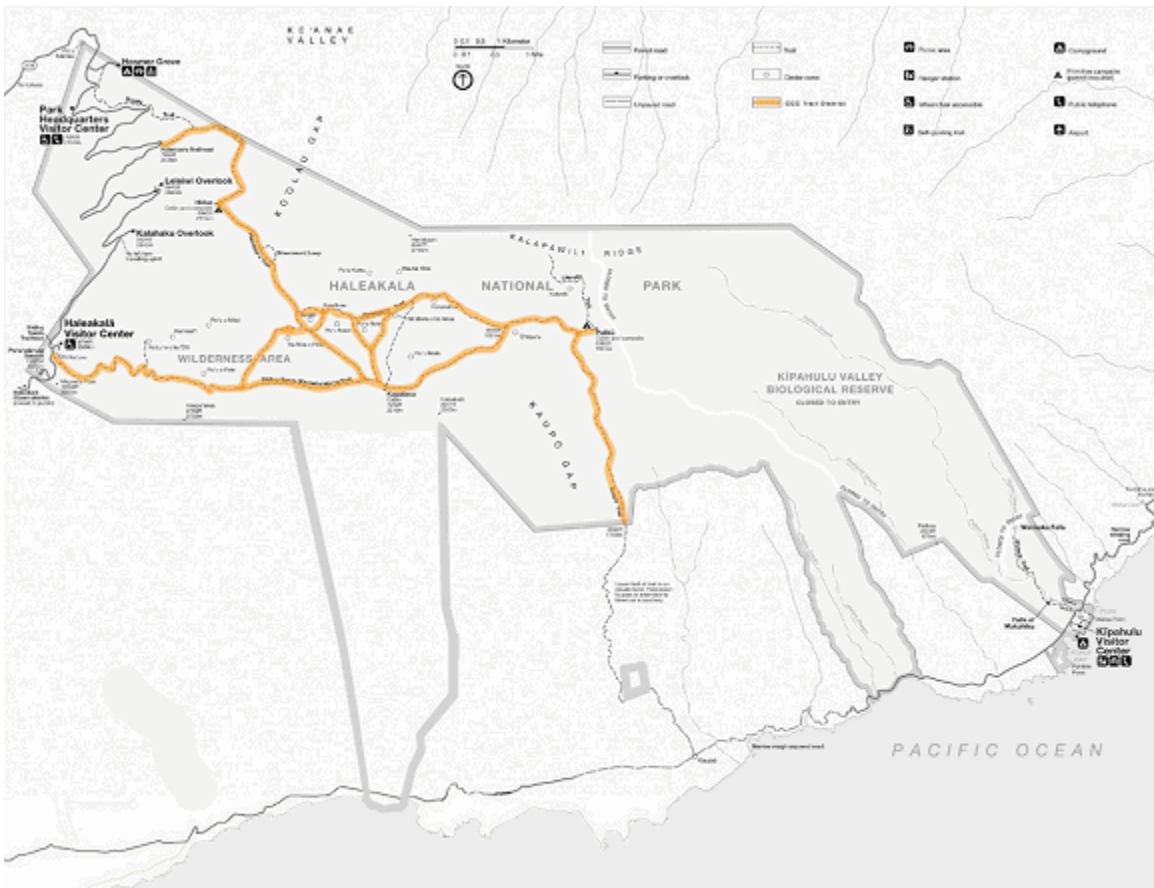
Size (Acres): 64.00

Boundary UTMS:

<u>Source</u>	<u>Type of Point</u>	<u>Datum</u>	<u>UTM Zone</u>	<u>UTM Easting</u>	<u>UTM Northing</u>
GPS-Differentially Corrected	Point	NAD 83	4	788,595	2,297,208
GPS-Differentially Corrected	Point	NAD 83	4	789,699	2,296,047
GPS-Differentially Corrected	Point	NAD 83	4	791,446	2,293,796
GPS-Differentially Corrected	Point	NAD 83	4	793,388	2,293,785
GPS-Differentially Corrected	Point	NAD 83	4	797,758	2,293,538
GPS-Differentially Corrected	Point	NAD 83	4	798,291	2,289,905
GPS-Differentially Corrected	Point	NAD 83	4	793,155	2,292,348
GPS-Differentially Corrected	Point	NAD 83	4	790,331	2,292,245
GPS-Differentially Corrected	Point	NAD 83	4	786,342	2,292,975

Civilian Conservation Corps Haleakala Crater Trails District Haleakala National Park

Location Map:



The Civilian Conservation Corps Haleakala Crater Trails District is located within the Haleakala Crater (NPS 2008). See the "Supplemental Information" section for a larger version of this location map.

Regional Context:

Type of Context: Cultural

Description:

“Haleakala” from the Hawaiian language means “house [used] by the sun.” Hawaiian legend tells that the demigod Maui lassoed the sun, slowed it down, and thereby lengthened the day, which allowed his mother Hina to dry her “kapa” (barkcloth) (Pukui and Elbert 1986). The Haleakala volcano remains significant in Native Hawaiian culture today.

Type of Context: Physiographic

Description:

Haleakala Crater is at the summit of a massive 10,000-foot dormant volcano on the Hawaiian island of Maui. The crater is a 3,000-foot-deep depression that is 7.5 miles by 2.5 miles wide. Surrounded by jagged mountain peaks, the crater is home to numerous threatened and endangered flora and fauna, most notably the “ahinahina” (silversword plant) and “nene” (Hawaiian goose). Geologic features in the crater include cinder cones, some of which rise over 600’ high. Haleakala Crater is memorable for its dramatic panoramas, which are highlighted with vivid colors that vary from ochre to lavender to gold. Later additions to the national park were intended to ensure the protection of some of Hawaii’s most outstanding natural features and endangered species, not only at Haleakala Crater, but also at the fragile ecosystem in the biological reserve of the upper Kipahulu Valley. Haleakala National Park was designated an International Biosphere Reserve in 1980.

Type of Context: Political

Description:

Haleakala National Park was originally a section of Hawaii National Park, which was established by Congress in 1916 to protect the outstanding natural features of Haleakala Crater on the island of Maui, and Kilauea and Mauna Loa volcanoes on the island of Hawaii. Haleakala became an independent national park, Haleakala National Park (HALE), in 1961. The park is located within the 2nd Congressional District of Hawaii.

Management Information

General Management Information

Management Category: Should be Preserved and Maintained

Management Category Date: 04/14/2009

Management Category Explanatory Narrative:

The proposed Civilian Conservation Corps Haleakala Crater Trails District meets the management criteria for Category B - Should be Preserved and Maintained. Fulfilling necessary requirements, the proposed district meets National Register criteria and has a continuing purpose or function that is appropriate to its traditional use or function. The proposed historic district is also compatible with the park's legislated significance, providing access to Haleakala Crater for visitor enjoyment.

NPS Legal Interest:

Type of Interest: Fee Simple

Explanatory Narrative:

All land located within the boundary of the proposed district is owned by the NPS.

Public Access:

Type of Access: Unrestricted

Explanatory Narrative:

Public access to all maintained crater trails is unrestricted, although, visitors must reserve cabins through an internet reservation system prior to stay.

Adjacent Lands Information

Do Adjacent Lands Contribute? No

Adjacent Lands Description:

Adjacent lands (lands outside the boundaries of the park) do not contribute to the significance of the proposed Civilian Conservation Corps Haleakala Crater Trails District because the district is limited to inside the crater.

National Register Information

Existing National Register Status

National Register Landscape Documentation:

Undocumented

National Register Explanatory Narrative:

The Civilian Conservation Corps (CCC) Haleakala Crater Trails District has not been previously documented or listed in the National Register of Historic Places, nor on the Hawaii State Register. The CCC Haleakala Crater Trails District is located within the boundaries of the Crater Historic District, which was listed on the National Register of Historic Places in 1974 under Criterion D, and includes the entire park within the boundaries of the district. However, this district did not evaluate all historic resources within its boundaries.

Additionally, the cabins, water tanks located within the crater, Sliding Sands Trail, Halemau'u Trail, and Paliku Foot Bridge were determined eligible for the National Register of Historic Places under Criteria A and D, and received SHPO concurrence on October 24, 1997. This determination of eligibility did not assess these resources as part of the trail system.

Existing NRIS Information:

NRIS Number:	74000289
Primary Certification Date:	11/01/1974
Name in National Register:	Crater Historic District

National Register Eligibility

National Register Concurrence:	Undetermined
Contributing/Individual:	Individual
National Register Classification:	District
Significance Level:	Local
Significance Criteria:	A - Associated with events significant to broad patterns of our history C - Embodies distinctive construction, work of master, or high artistic values

Period of Significance:

Time Period:	AD 1930 - 1941
Historic Context Theme:	Expressing Cultural Values
Subtheme:	Architecture
Facet:	Rustic Architecture
Time Period:	AD 1930 - 1941
Historic Context Theme:	Expressing Cultural Values
Subtheme:	Landscape Architecture
Facet:	The 1930's: Era Of Public Works
Time Period:	AD 1930 - 1941
Historic Context Theme:	Creating Social Institutions and Movements
Subtheme:	Recreation
Facet:	Tourism

Area of Significance:

Area of Significance Category	Area of Significance Subcategory
Architecture	
Landscape Architecture	
Entertainment - Recreation	

Statement of Significance:

The Civilian Conservation Corps (CCC) Haleakala Crater Trails District is locally significant under Criterion A for its association with early park master planning as implemented by CCC labor, and under Criterion C for its incorporation of park service rustic style. The period of significance is 1930-1941, which begins with initial comprehensive NPS planning of the crater trail system and reconstruction of existing crater trails, and ends with the last year the CCC conducted work on the trails. No major additions or modifications to the trails or cabin developed areas took place during the Army's use of the park during and after World War II or during the Mission 66 development period, as development during these two periods was restricted to outside of the crater (1).

The CCC Haleakala Crater Trails District is a good example of trail development within the context of park master planning, rustic design, and implementation by the CCC construction crews of the 1930s. Key characteristics that historically defined the historic trail system and developed areas are intact and continue to convey their historic character. These key characteristics include the trails' alignment, natural systems and features that influenced its design, human manipulated topography to accommodate the trails (cuts and fills), views from the trails of the crater and to the island and ocean below, its continued use as a tourist circulation system, and several buildings and structures, including the

rustic-style developed areas at Kapalaoa, Paliku, and Holua that contain cabins and water tanks built by the CCC. Some historic features of the trail system, including features within the developed areas, have been altered including drainage systems and trail tread in some locations along the trails. However, these modifications do not diminish the historical integrity of the district.

Criterion A - Park Master Planning and Civilian Conservation Corps

Early NPS Master Planning

In association with the events of the American Park Movement and early NPS master planning, the CCC Haleakala Crater Trails District is significant as an integral part of the master plan of Hawaii National Park. By the mid 1920s, NPS landscape architects, architects, and engineers initiated a design philosophy for the development of parks that would provide for the enjoyment of the parks by the public without compromising the natural and scientific attributes. To ensure that the parks were developed according to these principles, comprehensive plans were established that determined the extent and manner of development. Small, concentrated nodes of visitor services were located throughout the parks, connected by scenic highways and surrounded by wilderness that was accessible through trail systems. These “master plans” consisted of many sheets of planning and design drawings as well as textual supplements. The master plans included designs for buildings, roads, parking areas, trails and trailheads, park service areas, residential areas, and utilities. Unified planning ensured that the development would meet visitor needs in the most efficient and least damaging way (2).

Haleakala National Park was originally a section of Hawaii National Park, which was established by Congress in 1916 to protect the outstanding natural features of Haleakala Crater on the island of Maui, and Kilauea and Mauna Loa volcanoes on the island of Hawaii. Haleakala became an independent national park, Haleakala National Park, in 1961. Master planning efforts in the 1930s covered development on both islands. The first development plan for Hawaii National Park was completed in 1931. Existing records indicate that after this, updates occurred in 1932, 1935, 1936, 1937, 1938, and 1939. The islands’ remoteness limited park administrators’ ability to meet with Western Field Office designers, making the effort more difficult than for mainland parks (3). Nevertheless, the first set of drawings clearly articulate the major development themes that guided the entire planning process and resulted in the cultural landscape configuration experienced today. At Haleakala, the section’s anticipated a road to the crater’s edge allowed for access to a system of trails within the undeveloped crater (4).

Most aspects of park development were covered by the master plans, including buildings, roads, trails, backcountry shelters, fences, and picnic areas, as well as infrastructure systems like telephone, electricity, water, sewer, garbage collection, and forestry and fire protection systems. Of these, planners and designers limited development within the crater to a trail system that included three developed areas. The vast trail system within the crater was included in the park master plan because of the anticipated increase in park visitation once a roadway was constructed to the summit of Haleakala. The plan allowed visitors to experience the crater without marring the natural environment

that drew visitors to the park by promoting hiking and horseback riding in the place of automobile travel within the crater. While the plan proposed trails to connect developed areas outside of the crater to the interior crater trail network, most of the focus of the circulation plan emphasized pedestrian access within the crater (5).

In addition to circulation, the master plan at Hawaii National Park identified “developed areas,” small zones that were scattered across the park and contained most of Hawaii National Park’s buildings and structures. Strategically located along important stretches of road or trails, these points of concentrated usage provided a complete visitor experience while allowing most of the park to remain essentially untouched. The growth of the most important existing or proposed developed areas was tracked on individualized, highly detailed drawings as part of the general development plan documentation. At the beginning of the master planning effort in 1931, Hawaii National Park had six existing developed areas, five in the Kilauea section and one at Haleakala. Haleakala’s one developed area, the Haleakala Rest House, was constructed by the Maui Chamber of Commerce at Kalahaku Pali (6).

At first, park administrators and NPS Western Field Office designers focused on the growth of these existing developed areas, but in the 1930s they began proposing new ones. Though generally smaller and more remote than their predecessors, these developed areas exhibited the same calculated roadside siting and visitor-oriented functions. Proposed in 1931 was the Haleakala Observation Station, now Haleakala Visitor Center at White Hill, which originally consisted of a small overlook building, two comfort stations, and a surface parking lot for 90 cars. Sited in a dramatic crater-edge location at the end of the recently completed park road, this development was meant to serve as the major destination for Haleakala’s car-based visitors (7). In conjunction with automobile based services, the plan included three minimally developed areas within the crater to serve the pedestrians accessing the crater floor. These three areas included a cabin, water tanks, and outhouse at Holua, Kapalaoa, and Paliku.

Following the 1930s planning efforts, master plans were developed in the 1950s to address the deferred maintenance and languishing development within the park as a result of World War II. This post-war planning became the Mission 66 program, which was a ten-year nationwide initiative aimed at modernizing the Park Service and accommodating changing visitation patterns that would conclude in 1966 and commemorate the Service’s fiftieth anniversary year. Mission 66 planners sought ways to modernize or update park facilities and, at the same time, decrease the cost of development. At Haleakala National Park, in addition to planning new development within the existing visitor areas along the highway, the Mission-66 plans included extensive work within the crater in an effort to bring the trail system and developed areas into working order. To achieve this goal, the plan included various maintenance of the existing trail system and the realignment of sections of trail that could not be maintained. However, no new trails or major realignments were proposed for the crater trail system. Additionally, the planning during the 1950s focused on the removal of Army development, including fencing, telephone lines, and roads, that marred the view of the natural environment within the crater and the removal of non-native vegetation that grew rampantly throughout developed areas within the park. Attention was also given to address general disrepair of trails within the crater. The plan included limited modifications to the cabins within the crater. All of these goals focused on restoring the trail system and crater development to pre-war conditions. These plans built off of the core basis of the

initial 1930s planning efforts that the natural environment within the crater should be preserved through limited crater development (8). No plan since the 1930s has changed the overall purpose or layout of the crater trails system.

Civilian Conservation Corps

The Civilian Conservation Corps (CCC) Program hired unemployed men during the Great Depression. Started by Franklin D. Roosevelt within weeks of taking office, the CCC Program (initially called the Emergency Conservation Work program) aimed to provide work on public land for young men and in exchange these men would be provided compensation in the form of clothing, food, medical services, and cash. In the case of the National Park Service, the CCC labor provided a way to meet maintenance and construction needs within the parks. The CCC program in Hawaii included a camp at Kilauea on the Big Island and a second camp at Haleakala, and was administered jointly by the governor of Hawaii and the superintendent of Hawaii National Park, Edward G. Wingate.

Before the implementation of this much-needed federal program in Hawaii National Park at the end of 1933, the labor situation in the Hawaiian Islands was even more acute than on the American mainland. Throughout the early 1930s, critical projects at all sections of Hawaii National Park had to be continually delayed because of fiscal constraints in the congressional budget. The CCC was instrumental in accomplishing many development projects within the park as they were in other park and federal land throughout the country.

Projects set aside for the new workers initially concentrated on fire prevention, erosion control, trash and debris cleanup, insect control, tree disease control, reforestation, eradication of exotic species, trail construction and maintenance, and landscaping projects. As their training and supervision increased, CCC work crews at all sections of Hawaii National Park were gradually given more construction responsibilities. By the termination of the program in 1942, they had constructed much of the park's infrastructure, including comfort stations, employee housing, garages, barracks, trailside shelters, and a visitor center and museum at Kilauea. At Haleakala Crater they had constructed the main trail system, cabins, and water tanks by 1937 and remained as they main labor crew to provide continuous trail maintenance throughout the crater.

In 1940, when President Roosevelt declared a limited national emergency because of the escalating war in Europe, the focus of CCC efforts turned towards national security and military preparedness. While this restructuring of the CCC program was a great benefit to the national defense movement, it became increasingly difficult for the NPS to find recruits for conservation work. Gradually, the CCC camps at national parks either closed down or transferred to the Department of War. With America's declaration of war after the Pearl Harbor attack in December 1941, the NPS was forced to terminate all CCC projects that were not associated with the war effort. The closing of this program within the NPS was officially complete by June 30, 1943.

Criterion C – Rustic-style architecture and naturalistic landscape design

The “rustic” approach toward national parks is most clearly evident in the design of individual buildings and landscapes of the period. Eventually referred to as the “Park Service Rustic” style, NPS designers integrated “the natural landform and character of each site” and “native materials and pioneering techniques of a region” into the badly-needed new park buildings and landscapes (9). As a result, many park structures built between 1916 and World War II did not appear as unwelcome, man-made intrusions into an otherwise bucolic landscape. Rather, these “rustic” designs complemented their sites, providing points of interest and destination for the visitor. When possible, the use of materials and traditional building techniques typical of a particular park’s context, such as stone walls and foundations in rocky landscapes, thatch roofs in tropical climates, or adobe in the American Southwest, highlighted the unique aspects of each park and allowed new construction to appear more appropriate, or “natural,” to its setting.

The design of the trails within Haleakala Crater exhibit many characteristics of the naturalistic and rustic design styles, including the simple appearance of the trails that blends into the surrounding natural landscape through the carefully selected alignment that conforms with the topography, the use of rock and vegetation to blend rock cuts and fill slopes into the landscape, and the position of trails to provide views within the crater minimize the trail system’s footprint on the land and highlights the natural landscape. The 1930s design by NPS landscape architects provided access to this landscape within minimal intrusions to the visitor’s experience of the crater. NPS Chief Landscape Architect Thomas Vint and NPS Landscape Architect Merel S. Sager, both from the NPS’ Western Field Office, located in San Francisco, described the design for the crater as one that took into account the beauty of the unique landscape within the crater with a design that minimized visual intrusions and emphasized the spectacular topographical features within the crater. Both men described the crater as a spiritual place that would be marred by road access (10). Instead the focus was on the pedestrian experience within an otherworldly landscape. For this reason, the crater trail design utilized existing trails and added trail alignments only where the trails would not be sited prominently on the crater floor. The cabins within the crater were planned out of necessity of accessing the vast remote crater wilderness and for this reason limited to a simple wood shelter and water source to be used as a way station on the visitor’s journey through the crater. The Civilian Conservation Corps constructed the trail system and cabins within the crater through manual labor and hand tools to manipulate materials located on site. In this way the constructed crater trail system blended into the natural environment.

The trail system within the crater has maintained its CCC design to the present day. After years of deferred maintenance and construction brought about by World War II, park design occurred under the ten-year nationwide initiative to modernize national park visitor facilities while decreasing costs by 1966. Through the Mission 66 efforts to modernize Hawaii National Park, the crater trail system was repaired and maintained while additional trails were designed outside of the crater to connect planned developed areas within the park to the existing trail system within the crater. The design focused on providing pedestrian access throughout the park using modern trail construction techniques including trail base materials such as paving or gravel, and stone walls to denote the trail corridors. While these designs were utilized on new trails outside the crater, the crater trail system was maintained as it had been

designed in the 1930s. The existing trails were repaired with local materials or segments were realigned if they could not be repaired. No design changes were made to the cabin crater areas. This type of treatment of the crater trail system continued into the present day, as the design of the trail system maintains its rustic style and CCC-era construction methods.

ENDNOTES

1. In 2005, a multiple property determination entitled “Haleakala National Park Crater Historic District Amendment: Backcountry Historic District” was completed, but has not been submitted for SHPO review. In 2008, a CLI was completed for a 10.6-mile portion of the Haleakala Highway within the park boundary, finding it significant under Criterion A for its association with early park master planning and under Criterion C for its association with park service rustic style during the period of significance of 1933-1941. The SHPO concurred with the findings on September 8, 2008. In 2009, a draft Haleakala Headquarters Historic District Cultural Landscape Inventory Report was prepared, which documented the CCC work within the headquarters area. Building off of this documentation with further research and fieldwork, the following conclusions were drawn about the significance of the Civilian Conservation Corps Haleakala Crater Trails Historic District (CCC Haleakala Crater Trails District).
2. Ethan Carr, *Wilderness by Design: Landscape Architecture and the National Park Service* (Lincoln, NE: University of Nebraska Press, 1998).
3. Leavitt, Letter from Hawaii National Park Superintendent to NPS Director, September 28, 1931 (Haleakala National Park archives).
4. “Special Areas & Fire Control Plan” [drawing], 1931, “Master Plans—Hawaii National Park.” (Folder 3 of 5, Record Group 79, NARA-College Park).
5. Ibid; Thomas C. Vint, Chief Landscape Architect, “Report on Trip made by Landscape Architect to Hawaii National Park, Hawaii, February/March 1930,” December 14, 1931 (Haleakala National Park, 1931, Haleakala National Park archives); Merel S. Sager, “Radio Talk for Haleakala Road Opening,” text attached to “Superintendent’s Monthly Report,” March 1935 (Haleakala National Park archives).
6. “Special Areas & Fire Control Plan” [drawing], 1931.
7. “Haleakala Headquarters & White Hill Area” [drawing], 1936, “Master Plans—Hawaii National Park” Folder 3 of 5, Record Group 79, NARA-College Park.
8. U.S. Department of the Interior, National Park Service, Haleakala Master Plan, “Development Outline,” November 3, 1952; National Park Service, Haleakala National Park Master Plan, “Mission 66 Edition, Volume I: Master Plan Narrative,” Haleakala National Park archives.

9. Linda McClelland, Building the National Parks (Baltimore: Johns Hopkins University Press, 1998) 5.

10. Thomas C. Vint, Chief Landscape Architect, "Report on Trip made by Landscape Architect to Hawaii National Park, Hawaii, February/March 1930;" Merel S. Sager, "Radio Talk for Haleakala Road Opening."

National Historic Landmark Information

National Historic Landmark Status: No

World Heritage Site Information

World Heritage Site Status: No

Chronology & Physical History

Cultural Landscape Type and Use

Cultural Landscape Type: Designed

Current and Historic Use/Function:

Primary Historic Function: Hiking Trail

Primary Current Use: Hiking Trail

Other Use/Function

Horse/Bridle Trail

Outdoor Recreation

Scenic Landscape

Other Type of Use or Function

Both Current And Historic

Both Current And Historic

Both Current And Historic

Current and Historic Names:

Name

Haleakala Crater

Halemau'u Trail

Sliding Sands Trail

Keonehe'ehe'e (Sliding Sands)

Kaupo Trail

Paliku

Kapalaoa

Holua

Hele-mau (Halemau'u Trail)

Halemau (Halemau'u Trail)

Holoholo-ku (Kaupo Trail)

Hanakauhi (Halemau'u Trail)

Racing Sands Trail

Keone-heihei (Sliding Sands)

Type of Name

Both Current And Historic

Both Current And Historic

Both Current And Historic

Both Current And Historic

Both Current And Historic

Both Current And Historic

Both Current And Historic

Both Current And Historic

Historic

Historic

Historic

Historic

Historic

Historic

Ethnographic Study Conducted: Yes-Restricted Information

Associated Group:

Name of Group: Native Hawaiian

Type of Association: Both Current And Historic

Ethnographic Significance Description:

The following document provides broad, contextual ethnographic information for the proposed district:

Prasad, Usha K. and Myra J. Tomonari-Tuggle. "An Ethnographic Overview and Study of the Cultural Impacts of Commercial Air Tours over Haleakala National Park, Island of Maui". Prepared for National Park Service, Pacific West Region, Pacific Islands Support Office. International Archaeological Research Institute, Inc., Honolulu, 2008.

Chronology:

Year	Event	Annotation
AD 1841	Explored	Charles Wilkes and his party explored and mapped the area as part of the United States Exploring Expedition.
AD 1890	Established	By 1890, tourism was established in the Hawaiian Islands and Haleakala was Maui's prime attraction. The sunrise view had been established as an obligatory activity by then.
AD 1894	Built	The first facility, the crater rest house, was built at the crater's edge near current location of the Kalahaku Overlook.
AD 1900	Established	Organized visitor services to Haleakala's summit became available in the early twentieth century, including expeditions by horseback from Olinda.
AD 1914	Built	Due to vandalism of the rest house at Kalahaku, a new concrete rest house was built on the edge of the crater near the existing rest house by the Maui Chamber of Commerce.
AD 1916	Established	Hawaii National Park was established, which included Haleakala Crater in addition to the land on the island of Hawai'i.
AD 1924	Explored	Thomas Boles, the park's first superintendent, made his first trip to Haleakala.
AD 1927	Destroyed	Trails throughout the crater incurred storm damage and some trails were very steep making them difficult to use.
AD 1927	Planned	A shelter for Kaupo Gap was planned.
AD 1927	Planned	Halemau'u Trail, an 11 mile trail at an average 30% grade, was planned to be rebuilt at a 16% grade in order to avoid some of the storm damage caused by the existing steep grade. One other crater trails was planned to be rebuilt if funding could be acquired. The rebuilding did not occur until 1935.

Civilian Conservation Corps Haleakala Crater Trails District
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AD 1929	Destroyed	Halemau'u Trail was damaged beyond repair by heavy rains in June. Three miles of new trail were planned for a nearby gulch location.
AD 1930	Planned	NPS landscape architects Thomas Vint and Merel S. Sager planned the crater trail system. This marks the first time a comprehensive trail system is planned and designed for the crater.
AD 1930	Destroyed	All Haleakala trails were damaged by heavy rain. In March, all trails leading out of crater were planned for relocation and repair because of serious safety concerns.
AD 1930	Built	Halemau'u Trail was rebuilt with a drainage system and stone banks by local laborers.
AD 1931	Designed	A new trail was planned along the crater rim between the rest house and Halemau'u Trail.
AD 1931	Altered	Local laborers repaired the Haleakala Trail from Olinda to rest house in July. They also repaired trails from White Hills, Sliding Sands to bottom of crater floor, and entire Halemau'u Trail after storms damaged the trails. Some sections of these trails were realigned a few feet in either direction due to heavy erosion in places.
AD 1931	Built	A new trail was constructed by local laborers to connect the Halemau'u trailhead at the top of the crater to the Kalahaku rest house. Three miles were completed to "regular NPS standards" in June.
AD 1933	Maintained	Halemau'u Trail was heavily eroded in a storm, but was not repaired due to a lack of funds.
AD 1933	Maintained	All Haleakala trails are cleared, graded, and marked by park staff. Trail maintenance included clearing trails of loose debris and painting signs.
AD 1934	Established	A CCC camp of 25-50 men was established in Haleakala by this time.
AD 1934	Built	Sliding Sands Trail was rebuilt by CCC laborers.

Civilian Conservation Corps Haleakala Crater Trails District
Haleakala National Park

AD 1934	Altered	Halemau'u Trail erosion was repaired and sections of the trail were relocated by CCC laborers. Drainage was added along the trail to reduce erosion and protect the new trail surface.
AD 1934	Maintained	Road and trail cut banks and slopes throughout the park were seeded with grass by the CCC in an effort to minimize erosion.
AD 1935	Planned	A new alignment for the Halemau'u switchbacks was surveyed.
AD 1935	Maintained	All trails used for horseback riding were cleared of debris and repaired by the CCC.
AD 1935 - 1936	Built	Halemau'u Trail was widened by the CCC to standard width, cemented rock walls were built, guardrails were installed, and landscaping was improved "as directed by NPS Associate Architect Merel S. Sager." The work required blasting sections with explosives and packing in materials using mules. Stone was blasted, hand drilled, and used to construct retaining walls.
AD 1935	Planned	Three cabins were proposed within the crater.
AD 1936	Maintained	Six miles of trails in the crater were repaired by CCC laborers over four months in summer.
AD 1937	Built	Cabins at Holua, Kapalaoa, and Paliku were built by the CCC. The cabin areas included water tanks and the Paliku footbridge.
AD 1937	Damaged	The Halemau'u Trail was damaged by rain in February.
AD 1938	Maintained	Seven miles of trail were repaired by the CCC including holes filled, trails widened, and weeds pulled.
AD 1938	Maintained	Halemau'u Trail washed out and required extensive repairs.
AD 1938	Maintained	CCC crews spent four months in the summer clearing and repairing trails.

Civilian Conservation Corps Haleakala Crater Trails District
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AD 1940	Maintained	The trail between Paliku Cabin and Kaupo Village was repaired and maintained by the CCC.
AD 1940	Maintained	Sliding Sands Trail from Pakaoao (White Hill) Observatory to Kapalaoa Cabin was cleared of loose rock and sliding banks by the CCC.
AD 1940	Altered	A drainage-ditch system was added to Halemau'u Trail by the CCC.
AD 1941 - 1943	Military Operation	After the attack on Pearl Harbor, the park was completely closed to the public. The Haleakala section was reopened in January 1943.
AD 1943	Built	Park staff built a corral for mules near Kapalaoa Cabin, ¼ mile down the Waikane Spring Trail. Today there is no evidence of a corral.
AD 1944	Altered	Park staff and the Army installed telephone lines to each crater cabin, including Paliku Cabin.
AD 1946	Maintained	Park staff enlarged and repaired the corral at Kapalaoa Cabin that was damaged by a large cinder wash.
AD 1946	Altered	Park staff relocated telephone poles in the crater near Sliding Sands Trail.
AD 1947 - 1948	Maintained	Park staff made major repairs to Halemau'u Trail after the trail eroded in sections. Removal of large boulders and installation of grass (Kikuyu) sod along length of trail was included in the repair work.
AD 1947	Established	Equipment Operator from Sequoia National Park was transferred to Haleakala to oversee maintenance of trails, roads, water systems, and any major repair work.
AD 1948	Maintained	Park staff repaired all trails.
AD 1948	Altered	Park staff realigned Sliding Sands Trail around White Hill and a hitching rack was installed.
AD 1948	Maintained	Park staff cleaned and repaired White Hill and Silversword Trails.

Civilian Conservation Corps Haleakala Crater Trails District
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AD 1948	Built	One hitching rack was installed by park staff at Holua Cabin and at Paliku Cabin.
AD 1948	Maintained	Water tanks at Holua Cabin and Kapalaoa Cabin were repaired by park staff.
AD 1949	Maintained	The water breaks on Halemau'u Trail were rebuilt by park staff.
AD 1950 - 1951	Altered	Park staff repaired portions of the Halemau'u Trail with a base of broken rock and tamped earth fill, or rip rap. Additionally, the base of the switchbacks was rerouted.
AD 1950	Maintained	Maintenance and repairs were made by park staff to Silversword Trail, Sliding Sands Trail, Halemau'u Trail, and Kapalaoa Cross Trail. The "boggy spots" on Halemau'u Trail were stabilized by park staff.
AD 1950	Built	A ¾ mile long fence for an enclosed pasture was constructed near Paliku Cabin.
AD 1950	Built	A new trail was built to connect Halemau'u Trail to the road.
AD 1951	Maintained	Trail connecting to Holua was rebuilt due to wash out.
AD 1951	Rehabilitated	Unspecified improvements were made to Paliku Patrol Cabin.
AD 1951	Maintained	The water tanks at Paliku and Kapalaoa cabins were repaired.
AD 1951	Altered	The outhouse at the Paliku Ranger Cabin was replaced.
AD 1951	Built	A flood diversion ditch was constructed behind Kapalaoa Cabin.
AD 1951	Maintained	Grass sod and gravel were used for trail maintenance in the crater.
AD 1952	Planned	A master plan was developed to guide post-war rehabilitation of the park and to deal with deferred maintenance.

Civilian Conservation Corps Haleakala Crater Trails District
Haleakala National Park

AD 1952	Altered	Halemau'u Trail was altered with the addition of new drains in an effort to prevent erosion.
AD 1952 - 1956	Altered	The trails were improved in the Paliku and Kaupo Gap sections of the crater, including the trail from Honokahua (Green Hill) to Paliku and Kapalaoa to Paliku. This included rerouting in "some areas."
AD 1952 - 1953	Maintained	Park staff repaired Halemau'u, Sliding Sands, and central crater trails. Repairs included installation of a base course, repair of existing trail surface on 6 miles of Halemau'u and 1 mile of Kapalaoa, and the removal of grass and brush along trails. The repairs on Halemau'u Trail included fixing cross-drains, ditches, and the installation of 100 feet of fence and a gate at the foot of the trail.
AD 1954 - 1958	Maintained	Park staff surveyed trails and made condition assessments of each trail. Park staff removed debris, filled holes, leveled tread, and replaced metal signs with wood signs.
AD 1955	Planned	Mission 66 plan was developed to guide maintenance and new construction within Haleakala.
AD 1955	Maintained	Halemau'u Trail flood damage was repaired by park staff.
AD 1957	Maintained	Kaupo Gap Trail was cleared of loose rock, vegetation was cut back, and washed-out sections were rebuilt.
AD 1957	Maintained	The trail between Bottomless Pit and the cliff near Holua Meadow was repaired.
AD 1957	Maintained	Halemau'u Trail was repaired, including removal of loose rock and repair of water bars at cliff section.
AD 1958	Altered	Park staff conducted major repair work on Halemau'u Trail between Haleakala Mountain Lodge to junction of Halemau'u Trail at the crater rim. Sections of boggy areas were abandoned and the trail rerouted. Other boggy spots were repaired by sinking rock into the mud to create a solid trail tread. Banks were sloped back, loose rock removed, holes filled, water bars repaired, and washout sections rebuilt.

Civilian Conservation Corps Haleakala Crater Trails District
Haleakala National Park

AD 1959	Maintained	Crater trails on steep slopes were repaired by removing rock and cinders. Washout-sections of Kapalaoa Cabin-Paliku Trail were repaired.
AD 1959	Maintained	Four miles of Sliding Sands Trail required cinder removal, repair of washout sections, and removal of loose sand.
AD 1959	Maintained	Major repairs to all crater trails was required due to major wind and rain damage. The repairs included removal of loose rock, installing new signs, rebuilding trail edges, repairing water crossings, installing water bars, rerouting short sections of trail, and repairing many washouts along the trail between the lodge and the crater rim.
AD 1959	Maintained	Unspecified trail maintenance was conducted on the trail between the Bottomless Pit and Pali.
AD 1959	Maintained	Halemau'u Trail and half of the crater trails were cleared of loose rock.
AD 1961	Established	In June, Haleakala National Park and Hawaii Volcanoes National Park were designated as two separate parks.
AD 1962	Built	Holua cabin shed (Hilton) was constructed.
AD 1962	Built	Paliku cabin shed (Stable by Patrol Cabin) was constructed.
AD 1962	Built	Small storage sheds were built attached to the rear of Holua, Kapalaoa, and Paliku Cabins.
AD 1970 - 1979	Maintained	Culverts were installed on Halemau'u Trail and the Supply Trail.
AD 1970 - 1979	Maintained	The stone check steps, check dams, water bars, and other drainage features were maintained on the trail system as needed.
AD 1970 - 1979	Maintained	Riprap was installed along Halemau'u Trail and on Sliding Sands Trail between Kapalaoa and O'ilipu'u around 1975.
AD 1973 - 1977	Built	A 10,000 gallon water tank was installed behind the Paliku Patrol Cabin around 1975.

Civilian Conservation Corps Haleakala Crater Trails District
Haleakala National Park

AD 1970 - 1979	Maintained	In the 1970s, the cabins were painted.
AD 1970 - 1979	Developed	The campground areas at Holua and Paliku were developed. They consisted of a grass area and a sign marking the location.
AD 1980 - 1989	Rehabilitated	Unspecified modifications were made to Paliku Cabin.
AD 1980 - 1989	Altered	A culvert was installed along Halemau'u Trail just east of Holua Cabin.
AD 1990 - 1999	Maintained	Milled lumber was used to create check steps along Sliding Sands Trail.
AD 1990	Altered	The storage sheds located behind Holua and Kapalaoa cabins were repaired and concrete foundations were installed for both.
AD 1990 - 1999	Maintained	New stone was cut and laid for check steps along the Halemau'u Trail above the switchbacks.
AD 2008	Maintained	The first two miles of Sliding Sands Trail were repaired due to heavy erosion caused by a storm in December 2007.

Physical History:

Pre-1930

EARLY TRAVEL TO HALEAKALA

This pre-1930 history is adapted from the "Cultural Landscape Inventory Report for the Haleakala Highway" (1).

Numerous archaeological sites including “heiau” (temples), platforms, pictographs, and burial sites indicate that Haleakala was a significant destination for ancient Hawaiians. Precious resources such as basalt, a dense rock used for adze making, were gathered near the summit (2). Slingstones have been found in the crater district, suggesting that ancient people visited Haleakala to hunt birds whose feathers were used in traditional art and clothing. According to Hawaiian tradition, the crater was also a sacred place where religious ceremonies were conducted. Hawaiians often buried their dead in isolated, remote areas, thus making the crater a favored burial site. Finally, the crater was an important link in Maui’s transportation network; trails through the crater allowed for easier travel to East Maui (3).

The existing trails within Haleakala Crater had been used for a variety of purposes, first by the Native Hawaiians and then by settlers to the island. The Kihapiilani Highway, or the King’s Highway, was probably the most established trail. This was a thoroughfare paved with smooth rock that led from the summit area, through the crater and Kaupo Gap, to East Maui. Features within the crater suggest trails once were located within the crater that are no longer used today (4).

Three American missionaries stationed in Hawaii, Richard Green, Lorrin Andrews, and William Richards, were the first non Hawaiians to record their ascent of the massive volcano in 1828. After an early start from an undetermined location in East Maui, they reached the summit of Haleakala at about five o’clock in the afternoon. Although tired, they reported that they felt “richly repaid for the toil of the day, by the grandeur and beauty of the scene” (5). Thirteen years later, Charles Wilkes and his party explored and mapped the area as part of the United States Exploring Expedition. Wilkes’ account of his trip referred to the volcano as Mauna Haleakala, or House of the Sun, although he admitted he could not discover why it was so named. Some residents speculated that the name derived from the sun rising over the mountain and over to the people of West Maui (6).

Early explorers of Maui, including Alexander and Newton, mapped the trails within Haleakala Crater. The Haleamu’u Trail (also spelled as Hele mau, Halemauu, and Halemau) was mapped as early as 1881. The Kaupo Trail (previously called the Holoholo ku) was located within the Kaupo Gap and shows up on early maps of the crater. The Sliding Sands Trail (also called the Keonehe’ehe’e, Keone heihei, or Racing Sands Trail) is marked on early maps of the crater. The Leleiwi Trail may be the same or intersect with the Halemau’u Trail. And the Lau’ulu Trail which extends from Paliku to Kalapawili Ridge is also marked on early maps (7).

Other than sailors from the mid-nineteenth-century whaling boom in Hawaii, tourists on Maui

were rare until the late nineteenth century. In 1881, Constance Frederica Gordon Cumming described her horseback trip to Haleakala's summit. Guided by two natives, her party commenced in Makawao, situated on the slopes of Haleakala at an elevation of 1,500'. There were two choices for lodging between Makawao and the summit: S. T. Alexander's mountain house in Olinda (located at approximately the 6,000' elevation, east of today's Haleakala Highway), or a campsite in a 'lava bubble' (cave) about a mile below the summit (8). By 1890, tourism was established in the Hawaiian Islands and Haleakala was Maui's prime attraction. Although access to the crater was not easy, "The Tourists' Guide through the Hawaiian Islands" described the various ways visitors could reach the summit of Haleakala. Travel was available from several points, including central Maui's main town at the time, Wailuku (near Kahului); the north shore town of Paia; or Makawao, above Paia. The sunrise view had been established as an obligatory activity by 1890, and tourists started their ascent as early as 2:00 a.m., which allowed time for horses to travel at a slow pace. According to the tourist literature, the arduous travel was worthwhile, as travelers were rewarded with a view of "the most stupendous of nature's works." The author was impressed with the crater's immense size, asserting that it could hold the whole of New York City south of Central Park (9).

With tourism on Maui established, the first summit facility, a rest house, was constructed near the crater's edge at Kalahaku in 1894 (10). Organized visitor services to Haleakala's summit became available in the early twentieth century, including expeditions to Haleakala by horseback from Olinda (11). In 1911, The Maui News reported that tourist visits to Haleakala were increasing, though a 1914 editorial complained that Haleakala still attracted relatively few tourists. The newspaper pointed out that Kilauea, on the island of Hawaii, received many more visitors because it was accessible by road and Haleakala was not (12). The editorial foreshadowed the competition for improved roads to attract tourists that would develop between the islands of Maui and Hawaii in the coming decades. Despite the challenging access to Haleakala, tourists continued to visit the site and Maui residents remained committed to providing visitor services. The increasing number of visitors, as well as vandalism, rendered the rest house inadequate by 1914. A new concrete rest house on the edge of the crater at Kalahaku was built in 1914. In 1924-25, two sleeping dormitories, an observation room, and a concrete water tank were added. By then, locals had raised and spent nearly \$20,000 for improvements to accommodate visitors at Haleakala, creating an even stronger demand for improved access to the crater (13).

HAWAII NATIONAL PARK DEVELOPMENT

On August 1, 1916, Congress designated and established the crater of Haleakala on the island of Maui as one of three volcanoes comprising Hawaii National Park (Hawaii National Park) in the Territory of Hawaii; the other two being Kilauea Volcano and the summit of Mauna Loa on the island of Hawai'i. Although the initial boundaries for Haleakala were comprised of private lands, the Department of the Interior considered Haleakala part of the larger National Park, and referred to it as the "Haleakala Section." Access to Haleakala during this early period was by horseback via a trail from Olinda, located outside the park. A rest house at Kalahaku (9,300-foot elevation), which had been existence since 1894, provided sleeping quarters for visitors (this facility was administered by the Maui Chamber of Commerce). Although

established in 1916, NPS personnel were not stationed in the Territory until 1922 when Superintendent Thomas Boles was assigned to Hawaii National Park. Boles was headquartered at Kilauea on the island of Hawai'i, with responsibility for management of all the individual park units including Haleakala.

A variety of planned development within Haleakala occurred in the 1920s in order to bring tourists to the Maui. Plans for visitor services included construction of a new road and buildings to bring visitors to the rim of the crater, while the interior of the crater included a network of existing trails for visitors to explore by foot or horseback. The first superintendent assigned to Hawaii National Park, Thomas Boles, made his first trip to Maui in 1924. Most of his expenses were paid by Maui's Haleakala enthusiasts. Boles also spoke to the Maui Chamber of Commerce, whose members were interested not only in the possibilities of a Haleakala road, but also in general park development issues.

From 1922 to 1933, improvement occurred mainly in the Kilauea section of the park, even though the residents of Maui asked for additional attention within the Haleakala section of the park as early as 1921. The residents wanted protection of the native plant ahinahina (silversword) (14). Even with the interest of Maui residents, the Haleakala section of Hawaii National Park received little to no funding. This resulted in few improvements, including only basic maintenance and repair work on the crater trails prior to the work accomplished in the 1930s with the help of federally funded construction and maintenance projects. During this period ranchers used Sliding Sands Trail to drive cattle through the crater to get the cattle to market in exchange for the ranchers' land being incorporated into the National Park (15). The first major trail work conducted in Haleakala occurred in 1930 after the Haleamau'u Trail and other crater trails were in such disrepair that visitors could no longer use them (16). In these first years, park management determined the Kilauea section of the park to be a priority over maintenance and improvements in other sections of the park (17).

In 1924, the trails within Haleakala were considered to be in "excellent shape" and no major repairs or new trails were planned for the park (18). The condition of the trails quickly deteriorated, and by 1927, the trails had been washed out by heavy rains. With no money to repair the storm damage, the trails became virtually impassible to visitors, leading to a decline in the number of people hiking the crater floor (19). By this time the Haleamau'u Trail was planned to be rebuilt from the current grade of 30% to 16% in order to diminish the erosion caused by the steep grade. In May of 1928, the park superintendent requested funding to repair Haleamau'u Trail and one other trail within the crater (20). By 1929, the superintendent requested funding to completely rebuild Haleamau'u Trail due to major storm damage that washed out a majority of the trail. Money was to be diverted from the road planning and construction for the immediate need to rebuild the crater trails, which had become a safety hazard, for visitor use (21). In the fall of 1929, the superintendent requested that a new trail alignment for Haleamau'u be surveyed. This began the first planning stages for a new trail system (22).

1930-1933

The Haleakala Crater trail system project was planned by NPS Chief Landscape Architect Thomas Vint, and overseen by NPS landscape architect Merel S. Sager. In February 1930, Thomas Vint visited Maui to review the existing Haleakala Crater trail system and made recommendations for how the crater trail system should be rebuilt. His review was part of the overall Haleakala visitor services that were proposed, including building the Haleakala Highway. In part, he noted that “The Road program consists of building a road to a suitable point on the crater rim. There is no possibility of an around the rim road similar to that at Crater Lake, due to the nature of the topography. A road into the crater would be possible but would spoil the trip. The crater should be viewed like the Grand Canyon, and the only development within it should be only (sic) a trail program” (23). In the same report, Vint went on to recommend that in creating tourist facilities in Haleakala, the crater should be devoid of development and treated as a “sacred area” limited by trail access only. This marked the first time that park development at Haleakala had been examined in such broad terms and focused on the purpose of the park and the visitor experience. From Vint’s observations of the park, the first master plan for the Haleakala section of the park was developed in 1931 (24).

Upon Vint’s recommendations, work proceeded on the rebuilding and repair of the Halemau’u Trail under the direction of Superintendent E. P. Leavitt. The crater trails were described in March of 1930 as being “ruined” by heavy rains and required immediate funding to open the trails again to visitors (25). The first major repair work was completed in April 1930 with the help of laborers on the island, including Portuguese, Filipino, Hawaiian, and Japanese men. The finished trail was described as 4,500 feet long by 30 inches wide with a maximum 15% grade on straight segments and 10% on switchbacks. In general, removed earth and rock was piled up from 6 to 8 inches in height along the trail edge and the banks were sloped from 24 inches. The switchbacks required rock walls measuring 10 to 14 feet long by 6 to 10 feet high. Drainage was handled with a system of dips, ditches, culverts, and water breaks in addition to the trail tread sloped inward from 4 to 6 inches (26). Even with all the effort put into completing the Halemau’u Trail, the trail did not last long before major storms washed out sections and covered the tread with loose rock. In 1931, the trail was repaired for the first time, and would be plagued with major storm damage each year (27).

Various repairs to trails within the crater occurred in 1930-31 through the limited amount of funding that the superintendent could secure for such maintenance (28). The trails were regularly damaged due to a lack of drainage, which prompted the realignment of portions of the existing trails. In addition to the new alignment of the Halemau’u Trail discussed above, a segment was added in September 1931 to connect the trailhead at the top of the crater to the Kalahaku rest house. The additional 3.2 miles of trail allowed easy visitor access within a one day period from the crater floor to the rest house located just outside of the crater. The trail cut through terrain that included thick brush, many rocks and boulders, and washes. It was hoped that the trail would allow horseback travelers an easy passage where once only ranchers could navigate. The trail was described as being constructed to “regular NPS standards” (29). This was the only additional trail segment added prior to the major reconstruction effort undertaken by the CCC in 1934.

No trail maintenance was noted by the superintendent in 1932, but in 1933 a small number of maintenance projects occurred including the painting of existing trail signs and clearing of debris (30). Limited funding resulted in no repairs to major storm damage along the trails, even as visitor numbers increased. Due to a lack of funding, the Haleakala Trail in the crater remained unrepaired and blocked to visitor use because of safety concerns (31). The poor repair of the crater trails improved with federal funding and labor provided during the Great Depression.

CIVILIAN CONSERVATION CORPS

The Civilian Conservation Corps (CCC) Program hired unemployed men during the Great Depression. Started by Franklin D. Roosevelt within weeks of taking office, the CCC Program (initially called the Emergency Conservation Work program) aimed to provide work on public land for young men and in exchange these men would be provided compensation in the form of clothing, food, medical services, and cash. In the case of the National Park Service, the CCC labor provided a way to meet maintenance and construction needs within the parks. The CCC program in Hawaii included a camp at Kilauea on the Big Island and a second camp at Haleakala. The CCC was instrumental in accomplishing many development projects within the park as they were in other park and federal land throughout the country (32).

1934-1941

The 1930 plan to rebuild the trail system had been largely unfulfilled in the early 1930s due to a severe lack of funding. Even maintaining the trails within the crater became a challenge each time a heavy rain washed out portions of the trails. In 1930 and 1931, trail maintenance and repair consisted of clearing, grading, and marking the trails after each major storm (33). This all changed when the park received laborers and funding through the Civilian Conservation Corps. With the help of the CCC, Haleakala National Park's trail system received a major overhaul. Park staff planned an extensive trail system within the crater that included new trails, reconstruction of old trails, and the regular maintenance of trails damaged by each rainy season's storms. The trail system was enhanced with the construction of cabins within the crater, which included water catchment systems, telephone lines, horse corrals, and landscaping that were built or installed by the CCC labor crews. The crater trail system was fully developed by the time the CCC camp at Haleakala was shut down at the start of World War II.

Throughout the 1930s, the CCC laborers worked on a variety of projects within the Haleakala section of National Park. Many of the projects focused on improvements to the developed areas within the park, but a large portion of the CCC laborers' time was devoted to maintenance of the crater's trails. By 1934, a camp of 25-50 men worked on maintenance throughout Haleakala. Utilizing over \$650,000 in funding, the CCC men installed fencing, eliminated goats, restored forests, removed exotic plants, reforested the coast, built four cabins in Haleakala, brought water into the crater, and worked on a "complete revision of the Haleakala trail system" (34). The crews reconstructed many trails, including Sliding Sands Trail and Halemau'u Trail, in order to bring them to contemporary NPS standards for grade and width. Additionally, the crews built new trails that connected to newly developed cabin areas

within the crater and further outside of the crater in other sections of the park. The reconstruction of existing trails and installation of new trails coincided with the construction of the Haleakala Highway, which was dedicated on February 23, 1935.

NPS Landscape Architect Sager focused on making the Haleakala section of Hawaii National Park accessible to the public so that they could enjoy the natural beauty that Haleakala, and especially the summit and crater areas, had to offer. Sager explained Haleakala this way:

Haleakala Crater with its majestic expanse of colorful cones and precipitous walls has much to offer the observer in a spiritual way. It is akin to the Grand Canyon in its power to emotionally direct man's imagination into a realization of the great forces of nature. Here unfolded before him is the vivid story of not only the creation of a great mountain but of the creation of all the islands as well. Here is a panorama of elusive wild beauty which, thus far, the camera and brush have never caught. Haleakala is truly of national park standard and the National Park Service is proud of its part in making this superb spectacle accessible to all those who will only come and see. (35)

To that end, Sager coordinated the efforts of the CCC crews in the reconstruction of existing trails, the planning and construction of new trails, and the maintenance of trails so that the public could have access to the crater year round. Sager worked closely with the park's superintendents. At the end of 1933 Superintendent Leavitt, who oversaw project planning in Haleakala, was transferred to Mesa Verde National Park (36). Hawaii National Park's new superintendent, Edward G. Wingate, formerly of the Hawaii Volcano Observatory, oversaw the construction of the trail system.

Repairs

The superintendent reports of the early 1930s recommended the relocation of most of the trails within the crater, including Sliding Sands and Halemau'u Trails (37). Sliding Sands Trail was relocated to avoid excessive grades by the end of 1934, while plans for Halemau'u Trail included realignment due to high erosion of the current alignment from rain flowing down the steeply graded trail each rainy season. The work on Halemau'u Trail started as relocation of the very worst segments of trail and the installation of drainage to protect the repair work (38). A spur camp was set up inside the crater inside the Haleakala Crater at Holua on October 15, 1934 with a total of 23 laborers devoting their time to trail construction. The camp included two 1,000 gallon water tanks and a telephone line (39). By the beginning of 1935, the park's CCC crew constructed trails at the rim of the crater to connect the crater to the new highway. This followed with the construction of an additional CCC camp at Kapalaoa within the crater in order to begin the reconstruction of many of the trails along the crater floor in addition to major reconstruction work on Sliding Sands Trail (40). The CCC work crews spent most of their time at Haleakala reconstructing the two major trails within the crater.

Sliding Sands Trail underwent major reconstruction consisting of horizontal and vertical realignment, with no retaining walls or tread surfacing added (41). The trail reconstruction began in 1934 and continued into 1935. The old trail alignment was modified in order to reduce

the grade to no more than nine percent and remove loose sand along the trail tread. The superintendent reports note that the trail had over one foot of sand in places. The crews experimented with methods for keeping the loose sand in place, which included the use of an oil coating to seal the loose sand in place. It appears this method was not adopted as a permanent erosion control method. The modifications to Sliding Sands Trail were completed in May of 1935 (42).

In the instance of Halemau'u Trail, the reconstruction process was delayed as park staff first had to survey the terrain and plan an alignment least susceptible to erosion. Prior to this survey, the initial plan included repairing the existing trail alignment by resurfacing the trail and building new sections of trail only where erosion had caused serious problems. However, by May of 1935 it was determined that using the existing trail would not solve the erosion issues so approval was given to build an entirely new trail located away from washes and other badly eroded areas. Halemau'u Trail surveys were conducted in the spring and summer of 1935, which followed with staking out the new alignment with an average grade of twelve percent. The alignment took into consideration the rocky outcroppings and steep terrain of the crater's northwestern rim. The survey, which was completed in October of 1935, included a new portion of Halemau'u Trail that connected the crater rim to the highway. In addition, the survey included a new trail at the crater floor to connect Halemau'u Trail with Sliding Sands Trail (43).

Construction of the trail began before the surveys were completed because of the tremendous amount of time it took to complete construction due to all the hand labor required. Only 3/4th of a mile was constructed in the month of July in 1935. By August, a month later, the crew of twelve men had constructed one mile of trail from the highway toward the rim of the crater (44). By the end of November, the Halemau'u Trail alignment reached the crater floor. However, the trail was nothing more than a narrow footpath with exposed cliff edges. Much more work remained in finishing the Halemau'u Trail (45). The CCC crews had made substantial progress on a section of trail between the crater rim and crater floor. The laborers widened the Halemau'u Trail to standard width of four feet (wide enough for horses), installed cemented rock walls and guardrails, and planted landscaping along the trail. The NPS landscape architect, Merel S. Sager, oversaw the construction of the completed section which totaled approximately 1/4 mile, starting from the crater rim (46). The work of widening the trail took an incredible amount of effort due to the rocky terrain. The crews had to blast rock and hand drill rock to cut the trail alignment. In an effort to ensure minimal erosion to the trail, the men installed stone retaining walls made of cut pieces of the blasted rock that were set in cement and mortared (47). The completed section was seen as a big accomplishment toward the completion of the new trail system. Unfortunately for the park, the \$7,975 in funding for the Halemau'u Trail reconstruction ran out in February of 1936 due to an underestimation of the amount of time and labor it would take to build the new trail (48). However, the dilemma was short lived as the park secured additional funding and completed the trail by August, 1936 (49). This was the end of major construction of trails throughout the crater.

New Construction

In addition to reconstruction of existing trails, new trails were proposed in an effort to connect developed areas to the crater. A trail to White Hill was completed by the end of 1934 (50). A trail was proposed along the rim of Haleakala Crater in July 1935 (51). However, this trail was not constructed. Instead trails connecting the crater to specific points outside the crater were constructed. At the end of 1939 the Pu'u Nianiau Trail was almost complete, with the exception of the installation of ditches to drain water away from the trail. This trail ran from the Ranger Station at the park entrance to the Halemau'u Trail (52). That same year, a 1,500 foot trail was constructed at the rim of the crater to the base of a cliff near Pakaoao Observatory for visitors to view the silverswords, which were a ten minute walk from the highway (53). Additionally, new trails located within the crater connected the main trails along the crater floor to each other.

In addition to the new trails, cabins were planned and constructed within the crater. The park first included the proposed locations for the cabins in the 1935 master plan. From there, a 1936 standard "Haleakala Shelter Cabin" plan was developed for the construction of cabins within the crater. The Holua, Kapalaoa, and Paliku cabins within the crater were completed by September 30, 1937. Holua Cabin and water tank were part of the 1935 master plan for the park, but were not built until 1937 by the CCC for a total of \$3,400.54. Kapalaoa Cabin and water tanks were also included in the 1935 master plan, but were not constructed until 1937. The CCC also constructed this cabin and the water tanks for a total of \$2,703.87. Paliku Cabin, footbridge, and water tanks were indicated on the park's 1936 master plan as being a "proposed shelter" within the vicinity of their current location. The CCC completed two cabins, footbridge, and water tanks in 1937 for a total of \$2,778.66 (54). These cabins would receive maintenance over the years, but no major changes occurred to the cabins.

Maintenance

After the major reconstruction work and new trail construction was complete, the time consuming task of maintaining the trail system fell with the CCC laborers. Even with all of the newly constructed drainage systems and attention to the natural erosion patterns within the park, the trails received major storm damage during each rainy season. Repair work and general cleanup along the trails occurred annually, and sometimes monthly if severe storms battered the crater. The park superintendent kept records of the hours spent on trail maintenance, and this task took the most time of all the general maintenance within the park. The park generated many maintenance projects within the crater trail system and listed the trails within the crater by various names, presumably because the project documents were generated by different park staff. The Halemau'u Trail was often referred to as the Hanakauhi Trail or the Horse Trail. The Haleakala Kaupo Trail was also referred to as the Haleakala Connecting Trail (55). These name variations caused confusion among staff as to what trails were to be worked on and it causes confusion today as to what maintenance occurred on each specific trail. More importantly, however, these projects point to a massive amount of maintenance work required to keep the trails open to visitors and a limited number of staff to provide for regular maintenance that was anticipated after each storm.

The immediate response to the erosion problems with the crater trail system was to develop

new types of erosion control measures. In the spring of 1934, the laborers worked on planting grass seed on trail and road cut banks and slopes throughout the park in an effort to stabilize them (56). In 1935, the crews experimented with bituminous trail surfacing at the walkways within the residential areas, but it does not appear to have been conducted within the crater rim area (57). The trails from the observatory to the comfort station were constructed and surfaced with gravel and bitumuls in the late summer of 1936 (58). By the late 1930s, the park moved away from experimental erosion control, and focused on rebuilding damaged sections of trail, apparently giving up trying to build trails that would withstand the storms. Over the next decade, the park repaired various trails as they were damaged by storms. In 1937, Halemau'u Trail was damaged by heavy rains (59). And again, in the spring of 1938, Halemau'u Trail was washed out and major repairs were needed (60). That same year, seven miles of trails were maintained by filling potholes, pulling weeds, and widening trails for horse travel (61). General maintenance followed storm damage repairs.

By 1940 the repair work became so time consuming that the CCC laborers were directed to spend all their time maintaining the trails and highway in Haleakala rather than working on other projects in both the Hawaii and Haleakala sections of the park (62). The trail between Paliku Cabin, near Kaupo Village, was clear of debris and repaired so that it was "passable" (63). Sliding Sands Trail became a continual maintenance challenge. In 1940 the section of this trail between Pakaoao Observatory and Kapaloa Cabin was cleared of loose rock and sliding banks. On the other side of the crater, Halemau'u Trail had a drainage system constructed, including the installation of a major ditch system to channel water off the trail in an effort to diminish the erosion that washed out the trail each winter (64). General maintenance continued in 1941. Reconstruction of three miles of trail outside the crater occurred in addition to drainage work on the trail connecting the park entrance to Halemau'u Trail (65).

The great expense and time taken to continual repair the trails after each storm and provide general trail upkeep highlights the importance of this circulation system within Haleakala National Park. The trails and highway provided visitors' access to Haleakala in a way that they were never able to experience as easily prior to the new circulation system being constructed and maintained. Park visitation increased dramatically at the end of 1935, just after the road was completed. The highway provided access to the newly constructed trail system. It was reported that visitation increased by 455 percent between November and December 1935 (66). By 1938, the park publicized the 28 miles of trails in Haleakala through visitor brochures describing and showing visitors hiking or horseback riding the trails through the crater (67). Other brochures offer four day excursions by horseback from Wailuku to the summit of Haleakala (68). The trails allowed people to experience the crater in the way that landscape architects Vint and Sager envisioned when they planned the crater trail system. The trail system required a great expense to maintain, and this became a problem as World War II started. In May of 1941, the CCC labor camp in Haleakala was abandoned because they Army needed to use the buildings that housed the CCC crews (69).



CCC crews working on the Halemau'u Trail switchbacks, 1937 (Haleakala National Park archives).



Halemau'u Trail switchbacks, 1937 (Haleakala National Park archives).



Halemau'u Trail storm damage, 1937 (Haleakala National Park archives).



Historic photo of a CCC camp at Holua, 1937. Note the two water tanks located in the foreground. One of these tanks was presumably moved to the secondary developed area at Holua near the shed and campground (HALE photo collection).



Contemporary photo of Holua Cabin taken from Holua Cave (PWRO, 2008).



Holua Cabin, just after completion in 1937 (Haleakala National Park archives).

1941-1952

WORLD WAR II AND POST WAR MAINTENANCE

The Haleakala section of National Park was closed from December 7, 1941 to February 1, 1943 due to World War II (70). The Haleakala section of Hawaii National Park was used by the Department of War during this period and beyond, including use of the Red Hill area at the summit, just outside the crater. The Army returned the base camp site at Pu'u Nianiau to the NPS in 1946 and continued exclusive use the Red Hill site until 1948, and then operated portions of the site along with the Air Force, Mutual Telephone Company, University of Hawaii researchers, the Hawaii Air National Guard, the Federal Aviation Administration, and the Atomic Energy Commission into the mid 1960s, when the agreements were reached to either temporarily use areas within the park, or use lands outside the park or on other islands (71).

Immediately after the park reopened to NPS staff, the focus was on restoring the views into and out of the crater by minimizing or removing built features, such as corrals, within the crater. The superintendent directed work to soften the view around the new buildings that the Army had constructed. Throughout the park buildings were removed in order to restore a natural look in certain locations. Park staff planted vegetation, removed exotic plant species, and repaired erosion damage (72). Within the crater, the park staff moved existing built features so that they

would blend more easily into the natural landscape. The superintendent described that corrals were to be moved outside the forest in order to obscure the view of the corrals from the rest house to the forest. It was also noted that the mules should not be tethered within reach of the forest in order to minimize the damage done to the understory by the mules grazing (73). An additional corral was added at Kapalaoa Cabin on Waikane Spring Trail for the maintenance crews' use while working in the crater. This location was chosen in order to limit the amount of fencing needed, as the bottom lands in this area were flanked by two cliffs, which became two sides of the corral (74). A $\frac{3}{4}$ -mile-long fence was installed for a pasture at the meadow near Paliku Cabin (75). Additionally, the developed areas within the crater were repaired (76). In 1948, water tanks at Holua Cabin and Kapalaoa Cabin were repaired. In 1951, the water tanks at Paliku and Kapalaoa Cabins were repaired and the outhouse was replaced at the Ranger Cabin (77). Four hitching racks were constructed for Holua Cabin, Paliku Cabin, and at the Sliding Sands Trailhead (78). Around the same time, existing telephone poles within the crater were relocated toward Sliding Sands Trail (79). These efforts to minimize the visibility of built structures were a continuation of the principals that guided the initial development within the park as a natural area with limited constructed features to spoil the view.

Few major repairs occurred within the crater trail system until the Halemau'u Trail was badly damaged in heavy rains in the fall of 1947 (80). An equipment operator was brought in from Sequoia National Park to conduct major rehabilitation projects and regular maintenance of the road, trails, and water system within Haleakala (81). Before this period, the superintendent noted that no major repairs had been conducted on the trail system since the major reconstruction of Halemau'u Trail in 1935. Major erosion had taken place in the seven years since the park actively maintained the area. The superintendent went on to describe the trails as "either completely overgrown or otherwise rendered unusable during the war. Practically all of them have now been cleared or otherwise restored" (82). In July of 1947, work started on packing in "large quantities" of Kikuyu grass sod and installing it along the length of Halemau'u Trail in an effort to provide a stabilized surface that would withstand the erosion that plagued the trail throughout its history (83). The sod installation continued into the summer of 1948 (84). In 1949, the water breaks on Halemau'u Trail were rebuilt (85). By 1950, Halemau'u Trail still had major erosion problems, even after the sod was installed. This led the park staff to try a different approach by using "a base of broken rock and tamped earth fill" or riprap to "stabilize the boggy spots" along the length of the trail. Steady horse use on this trail had created areas of mud along the trail that turned into holes that could not be filled easily. Some areas were beyond repair, including a 1.5-mile section of Halemau'u Trail just above the lowest switchback which was rerouted and reconstructed (86).

In addition to the work on Halemau'u Trail, other trails within the crater were repaired but not to the same extent. In 1948, the Sliding Sands Trail was routed around White Hill near the parking lot and at the trailhead hitching racks were installed (87). General maintenance of trails occurred throughout 1950, including on Sliding Sands, Halemau'u, Kapalaoa, and Silversword Trails (88). One mile of new the trail from the Pu'u Nianiau lodge to the crater rim was constructed in 1950 (89). A new trail also connected Halemau'u Trail to the highway. In 1951, the trail to Holua was completely rebuilt due to major erosion that washed out the trail (90). That same year, ditches were dug at the back of Kapalaoa cabin, as a flood diversion measure

(91). After the maintenance work of 1947-1951, the park trail system was described as having undergone a “considerable amount of improvement” (92). This also described the park as a whole, as the roads, buildings, and visitor services were revamped at this time by addressing deferred maintenance issues.

1952-1969

The Master Plan developed in 1952 for the Haleakala section of Hawaii National Park included direction that the army base camp at Haleakala would be converted to park use after World War II (93). While many conversions had already been made including the removal of unwanted buildings and the replacement of landscape removed during the park’s use in the war, little in the way of major redevelopment occurred due to a lack of funding. General trail maintenance on the trails throughout the crater included repairing the trail surface and removing vegetation including grass and brush. Additionally, several storm damage repairs were conducted through the 1950s. The trail to Paliku and Kaupo Gap were rebuilt, which included the section of trail from Honokahua (Green Hill) to Paliku and the Kaupo Gap Trail from Paliku to the park boundary in 1952 (94). Halemau’u Trail was rebuilt in several places and the use of sod and gravel to maintain a stable trail tread continued to be employed by park staff. In 1952, drains were installed along the trail in order to minimize the erosion damage and washout prone areas and at the same time repairs were made to Sliding Sands (95). Slides and washouts along Halemau’u Trail and Kapalaoa Paliku were repaired in 1953. Additionally, 100 feet of fencing was installed along the foot of Halemau’u Trail (96). General trail repair continued between 1954 and 1958, including removing loose rock, filling holes, replacing signed, cutting vegetation, blocking short cuts, and repairing water bars (97). These repairs were made in an effort to maintain the limited existing development within the crater.

To further park planning and development that was sensitive to the natural environment, on September 13, 1960, Congress authorized the establishment of the Haleakala Section of Hawaii National Park as a separate unit of the national park system to be known as Haleakala National Park. The legislation took effect on July 1, 1961. Hawaii National Park was split into two parks in order to further the conservation of the natural and cultural resources. Additionally, congress created the Wilderness Act which designated a large portion of Haleakala as "Wilderness" on October 20, 1964.

MISSION 66 PROGRAM

Due to years of neglect in the national parks around the county, the Mission 66 program was developed as a way to update and improve the park infrastructure. The program was a ten year nationwide initiative to conclude on the National Park Service’s fiftieth anniversary. It was widely believed that “overuse of the deteriorating and outdated infrastructure in the parks, resulting in injuries, complaints, and damage to the parks, and a generally unfulfilling experience for tourists.” The Mission 66 program aimed at improving public facilities and increase staffing for immediate needs while also planning for long term growth of the park system. The long held view within the park service director’s office that development was needed to attract tourists, which in turn created the public support for the parks. NPS Director during the Mission 66 era, Conrad Wirth understood the “paradox of protection by development.” Wirth

believed that “good development saves the landscape from ruin, protecting it for its intended recreational and inspirational values” (98).

During the Mission 66 era, the trail system within Haleakala Crater remained relatively the same. The Master Plan for Mission 66 within the Haleakala section of Hawaii National Park included planning for many landscape and circulation features. In terms of the vegetation, the park’s goal was to control exotic plants and replace native trees, which could not reproduce because of the dense growth of introduced grasses (99). The Mission 66 plan for the trail system within the crater included expanding the trails to other points of interest while aligning the trails out of view from the rim of the crater and relocating the utilities so that they would not be within view from the crater looking out. The areas of development occurred outside the crater, at the Leleiwi Lookout Point, the Kalahaku Overlook, and Red Hill, with the addition of trails connecting these developments within the park. The plan noted that 32.5 miles of trail existed within the park and that maintenance, minor construction, emergency repair, and temporary relocation of the trails would be necessary (100). According to the 1963 Master Plan for the park, the only structures constructed within the crater were the sheds at Holua and Paliku. Each shed measured 12' by 24'. The developed areas in the crater included one pit toilet each. No stables, pasture areas, or campgrounds were mentioned in the description of the crater facilities at this time.

Major repairs to the trail between Haleakala Mountain Lodge at Pu’u Nianiau and the junction of Halemau’u Trail occurred in 1958 and 1959 including the rerouting of sections of trail around boggy spots, the infill of boggy spots with riprap tread created by “using rocks to sink in mud to create a solid base,” filling in washouts, rebuilding trail edges, and repairing water crossings (101). Within the crater, Halemau’u Trail repairs included removing loose rock from the trail, repairing water bars, and filling in boggy spots with rock (102). Sliding Sands Trail repair included fixing wash outs by shoveling sands out of the trail tread and removing cinders (103). The trail between Kapalaoa Cabin and Paliku washed out in 1959 and had to be repaired (104). No trail maintenance was noted in the superintendent’s reports from 1960-61. No evidence was uncovered of major maintenance or repair projects that occurred in the 1960s.



Sliding Sands Trail, 1960 (Haleakala National Park archives).

1970s-PRESENT

Various maintenance occurred on the trail system throughout the 1970s to the present. No major trail realignments or additions to the trail system were made during this period. The maintenance repairs that did occur focused on the drainage systems within the trails in order to minimize the erosion problems associated with each trail. During this period, Eddie Grasa, the Roads and Trails foreman for the park, worked on a variety of maintenance projects within the crater (107). He installed culverts along the Halemau'u Trail in the 1970s and the Supply Trail in the 1980s. Stone check steps, stone check dams, and other drainage systems were maintained by park staff with few additions to these drainage systems. The Halemau'u Trail stone water bars were maintained during this period. The culvert along Halemau'u Trail, just east of Holua Cabin was installed by park staff person Ted Rodrigues and the Young Adult Conservation Corps crew in the 1980s. Riprap was installed in the 1970s along the Halemau'u Trail switchbacks in places where erosion had taken place. The rock for the riprap was taken from the surrounding area. The stone work was accomplished with sledgehammers, picks, shovels, and crowbars. Later a gas power drill was used in addition to hand tools. Riprap was also installed during this time period along the Sliding Sands trail between Kapalaoa and 'O'ilipu'u. These types of erosion control measures were similar to those used in the 1940s and 1950s.

In addition to the stone work used in the drainage systems, the maintenance crews cleared the trails of debris. The crew shoveled Sliding Sands Trail clear of sand every summer (108). Park staff also maintained the crater trails by clearing vegetation along the trails, such as cutting the grass along Kaupo Trail with a machete, banking the sides of the trails, and setting rock along the top of steep sections of trail (109). The developed areas were maintained during this period with minimal additions to these areas within the crater. The 10,000 gallon redwood water tank behind Paliku Patrol Cabin was added in the 1970s. The water spigots by the

cabins were added in the 1980s (110). Overall, the work accomplished by the park crews was routine maintenance and repairs necessary for the stabilization of the crater trails and developed areas. Similar methods of maintenance that occurred during the CCC era were used in the 1990s through to the present.

Similar methods of maintenance are used today. Where stone check steps and water bars have needed repair on Halemau'u Trail, stone has been cut using rock from the surrounding area. Other check steps have been added to Sliding Sands using 2x4 lumber. The trail crews pack in materials on horse and stay at the cabins as they work on the crater trails. No major repairs or realignments to the trails have been made in the last couple of decades.

As with parks around the nation, Haleakala National Park has seen significant increased in visitation. In Haleakala is Maui's second most popular attraction and reached record numbers of visitors in 1997 (111). With increasing visitation at Haleakala, park officials expected that the park would need to increase maintenance on the crater trail system and developed areas, which would require additional staff and funding.

SUMMARY

The CCC Haleakala Crater Trails District located in Haleakala Crater is a comprehensive trail system that includes dramatic views from the walls of the crater and rest areas at three cabins located on the crater floor. This crater trail system is based on two major trails utilized before the land became part of the park and became an extensive network of trails through the park's first planning efforts and vision of NPS landscape architects in 1930. From the trail system's initial development in the 1930s through the work of day laborers and then the work of CCC laborers, the system has maintained its current overall alignment and built features since that time. Although major storms caused erosion and damage in some areas of trail, the CCC laborers were able to repair storm damage each year and maintain the trails that they had constructed. The trails also received repair and maintenance work after World War II as part of the Mission 66 planning effort. This work was necessary in order to maintain visitor access into the crater. The maintenance and repair work that did occur after the CCC era continued to blend into the natural environment, which provided the same visual experiences as during the CCC era. Today, the CCC Haleakala Crater Trails District is maintained primarily by packing in materials and repairing trails by hand. Although there have been alterations to the trails over time, the trail system has remained as the National Park Service designers intended. The trails follow the topography, highlight the views from the crater, and remain blended into the surrounding environment.

ENDNOTES

1. U. S. Department of the Interior, National Park Service, Cultural Landscape Inventory for the Haleakala Highway, Haleakala National Park (Oakland: Pacific West Regional Office, 2008) 24-26. The text for this section came directly from this report.
2. Will Kyselka and Ray Lanterman, Maui, How It Came to Be (Honolulu: University of Hawaii Press, 1980) 133.

3. Gail Bartholomew, *Maui Remembers: A Local History* (Honolulu: Mutual Publishing, 1994) 138.
4. M. J. Tomonari-Tuggle and H. David Tuggle Archeological Overview and Assessment for Haleakala National Park, Island of Maui (Honolulu: International Archaeological Research Institute, Inc., September 2007) 84-86; Gail Bartholomew, *Maui Remembers*, 138.
5. *Missionary Herald* XXV, no. 8 (August 1829) 246-251.
6. Charles Wilkes, *Narrative of the United States Exploring Expedition During the Years 1838, 1839, 1840, 1841, 1842*, vol. 4 (New York: G.P. Putnam, 1856) 252-254.
7. Tomonari-Tuggle and Tuggle, 93.
8. Constance Frederica Gordon Cumming, "The Largest Extinct Volcano: An Ascent of Haleakala," *Scribner's Monthly* 22, no. 2 (June 1881) 274.
9. Henry M. Whitney, comp. and ed., *The Tourists' Guide Through the Hawaiian Islands, Descriptive of Their Scenes and Scenery* (Honolulu: The Hawaiian Gazette Company, 1890) 79-81.
10. *Maui News Haleakala Souvenir Edition*, Supplement to *Maui News*, Issued in Commemoration of the Official Opening of the Scenic Highway to the Summit of Haleakala, the World's Greatest Dormant Volcano (Wailuku: Maui Publishing Co., February 23, 1935) 9.
11. *Haleakala Souvenir Edition*, 90; and "E.J. Walsh Buys Aiken Mountain Interests Here," *Maui News*, September 23, 1931, 1-2.
12. "Makawao News Item," *Maui News*, January 14, 1911, 2; and "Our Neglected Assets," *Maui News*, June 6, 1914, 4.
13. *Haleakala Souvenir Edition*, 9. The rest house facilities were given to the NPS in 1934.
14. "The Silver Sword," *Semi Weekly Maui News*, September 20, 1921, 4.
15. Hugh L. Crenshaw, *Legislative History (Hawaii National Park)* 1972.
16. Boles, "Superintendent's Monthly Report," March 7, 1930, Haleakala National Park archives; Frances Jackson, *An Administrative History of Hawaii Volcanoes National Park and Haleakala National Park* (Honolulu: University of Hawaii, 1972).
17. Boles, Thomas, "Boles to Horace Albright, field assistant, National Park Service, Yellowstone, May 5, 1922" in folder "Superintendent Reports, 1922-1928," Haleakala National Park archives.

18. Ibid, July 1924.
19. Evans, March 10, 1927.
20. Ibid, May 4, 1928.
21. Allen, June 5, 1929; Ibid, March 7, 1930.
22. Ibid, October 5, 1929.
23. Thomas C. Vint, Chief Landscape Architect, "Report on Trip made by Landscape Architect to Hawaii National Park, Hawaii, February/March 1930," December 14, 1931 (Haleakala National Park, 1931), Haleakala National Park archives.
24. Carey & Co. Inc., Draft Determination of Eligibility for Hawai'i National Park: Planning and Development through World War II, (San Francisco: Carey & Company, 2005).
25. Allen, March 7, 1930.
26. Leavitt, "Final Construction Report," May 5, 1931, 1-2, Haleakala National Park archives.
27. Leavitt, "Superintendent's Monthly Report," August 3, 1931.
28. Ibid, May 6, 1930; Ibid, July 11, 1931.
29. Hawaii National Park, "Final Report: Halemau to Rest House Trail Extension (Haleakala Section)," completed September 1931, Force Account, E. P. Leavitt, Superintendent; Leavitt, "Superintendent's Monthly Report," August 3, 1931, Haleakala National Park archives.
30. Leavitt, "Superintendent's Monthly Report," January 1, 1933.
31. Ibid, July 7, 1933.
32. Carey & Co. Inc., Draft Determination of Eligibility for Hawai'i National Park.
33. Leavitt, "Superintendent's Monthly Report," August 8, 1933.
34. "Articles and Broadcasts by Wingate/Christ (1935-1940)," Edward G. Wingate, "General Statement on Hawaii National Park for Information of Congressional Committee Studying Statehood for the Territory of Hawaii," 3; Sager, September 20-October 20, 1934, 3.
35. Wingate's "Superintendent's Monthly Report," March 1935; and Merel S. Sager, "Radio Talk for Haleakala Road Opening," text attached to "Superintendent's Monthly Report," March 1935 (Haleakala National Park archives).

36. Leavitt, "Superintendent's Monthly Report," September 1933; and Edward G. Wingate, "Superintendent's Monthly Report," January 1934.
37. Wingate, "Superintendent's Monthly Report," November and December, 1934, 3.
38. Ibid, December, 1934 and January, 1935, 3-4; Ibid, July 1934.
39. Sager, October November, 1934, 3; Wingate, November December, 1935, 3.
40. Wingate, January and February, 1935, 2-3; Ibid, June July, 1935, 2.
41. Ibid, January and February, 1935, 2-3.
42. Ibid, May 20 June 20, 1935, 2.
43. Wingate, "Superintendent's Monthly Report," May and June, 1935, 2; Wingate, "Superintendent's Monthly Report," June and July, 1935, 3; Department of the Interior, National Park Service, Final Construction Report: Job 517, Location Survey and Construction New Halemau u Trail, Construction Ended February 27, 1936 (Haleakala National Park archives).
44. Wingate, "Superintendent's Monthly Report," July and August, 1935, 2 3.
45. Ibid, October and November, 1935, 3.
46. Ibid, December, 1935; Ibid, October, 1935; Ibid, November, 1935.
47. Department of the Interior, Final Construction Report: Job 517; Wingate, "Superintendent's Monthly Report," January 31, 1936 (Haleakala National Park archives).
48. Edward G. Wingate, supervisor, "Resume of the work of NPS Hawaii National Park, Fiscal Year ending June 30, 1937," 4 (Haleakala National Park archives).
49. Wingate, "Superintendent's Monthly Report," August 10, 1936.
50. Ibid, October and November, 1934, 3.
51. Ibid, July 1935.
52. Ibid, December 31, 1939; Ibid, January 31, 1940.
53. Ibid, June 30, 1939, 2.
54. Draft Haleakala National Park Crater Historic District Amendment: Backcountry Historic

District, no author, n.d.

55. Wingate, "Superintendent's Monthly Report," August 8, 1939.

56. Merel S. Sager, "Narrative Report to the Chief Architect through the Superintendent of Hawaii National Park, April 22 May 25, 1934," 3 (Haleakala National Park archives).

57. Wingate, "Superintendent's Monthly Report," January and February, 1935, 2 3.

58. Ibid, September 9, 1936.

59. Ibid, February 28, 1937.

60. Ibid, April 10, 1938.

61. Ibid, January 11, 1938.

62. Ibid, November 11, 1940.

63. Ibid, September 30, 1940.

64. Ibid, March 1, 1940.

65. Ibid, January 31, 1941; Ibid, February 28, 1941.

66. Ibid, November 1935.

67. Department of the Interior, National Park Service, Hawaii National Park (US Government Printing Office, visitor brochure, 1938) 18, 30.

68. Department of the Interior, National Park Service, Rules and Regulations of Hawaii National Park (US Government Printing Office, visitor brochure, n.d.) 12-13.

69. Wingate, Edward G. "Wingate to Commanding General, Hawaii Department, USA, Ft. Shafter, Territory of Hawaii, May 15, 1941," in folder "Army use Haleakala (1941)," Haleakala National Park archives.

70. Ibid, February 1, 1943.

71. Frances Jackson, "Military use of Haleakala National Park," Hawaiian Journal of History, 6 (1972): 129-141.

72. Wingate, "Superintendent's Monthly Report," April 3, 1945; Ibid, November 27, 1945.

73. Wingate, "Superintendent's Monthly Report," December 6, 1943.

74. Ibid, July 8, 1943; Oberhansley, July 3, 1946, 1.
75. Oberhansley, March 2, 1950, 1.
76. Ibid, September 30, 1948, 2; Ibid, November 1, 1948, 1.
77. Ibid, February 2, 1951, 1.
78. Ibid, June 1, 1948, 2.
79. Ibid, April 8, 1946, 2.
80. Ibid, December 10, 1947, 4.
81. Ibid, November 8, 1947, 4.
82. Oberhansley, "Annual Report to the Director Fiscal Year 1947," 5 6.
83. Ibid, July 31, 1947, 1.
84. Ibid, July 12, 1948, 2.
85. Ibid, November 2, 1949, 2.
86. Ibid, June 4, 1950, 1; Ibid, April 3, 1950.
87. Ibid, July 12, 1948, 2.
88. Ibid, July 3, 1950, 1-2.
89. Ibid, March 3, 1950, 1; Ibid, March 7, 1950.
90. Ibid, May 1, 1951, 2; Ibid, March 2, 1951, 1.
91. Ibid, April 2, 1951, 2.
92. Oberhansley, "Annual Report to the Governor of the Territory of Hawaii (1949 1953)," July 20, 1950.
93. U.S. Department of the Interior, National Park Service, Haleakala Master Plan "Development Outline," November 3, 1952.
94. Oberhansley, "Superintendent's Monthly Report," April 2, 1952, 1.

95. Ibid, May 1, 1951, 2; Ibid, March 2, 1951, 1; March 3, 1952, 1; April 2, 1952, 2.
96. Ibid, June 4, 1953, 1-2.
97. Ibid, September 3, 1955 January 3, 1958.
98. U. S. Department of the Interior, Cultural Landscape Inventory Report for the Haleakala Highway, 38 39.
99. U. S. Department of the Interior, National Park Service, Haleakala National Park Master Plan, "Mission 66 Edition, Volume I: Master Plan Narrative," 7.
100. Ibid, 8; Ibid, Chapter 4, 2.
101. Wosky, "Superintendent's Monthly Report," January 3, 1958, 1; Ibid, June 5, 1959, 5.
102. Ibid, May 2, 1958, 5.
103. Johnston, March 3, 1959, 5; Ibid, September 3, 1959, 5.
104. Wosky, February 1, 1959, 4.
105. Eddie Grasa worked in the park from 1960 to 1988.
106. U.S. Department of the Interior, National Park Service, Haleakala National Park, Memorandum from Elizabeth Gordon, HALE Cultural Resource Program Manager and Archeologist, "Interview with Eddie Grasa (ph#808 572 0133), ex HALE Roads and Trails Foreman," August 8, 2008.
107. Ibid.
108. Ibid.
109. "Haleakala visitors set record in 1997," Honolulu Advertiser, June 19, 1997, B1.

Analysis & Evaluation of Integrity

Analysis and Evaluation of Integrity Narrative Summary:

Located at the summit of a massive 10,000-foot dormant shield volcano, Haleakala Crater is a 3,000-foot deep depression, measuring approximately 7.5 miles by 2.5 miles wide. Designated primarily as wilderness, the crater includes rustic development built by the NPS, using Civilian Conservation Corps (CCC) labor after 1932. Between 1930 and 1941 the NPS constructed and/or improved an extensive trail system, which was planned by park landscape architects to blend with the natural environment by including a low grade, curvilinear alignment, standard width, stone retaining walls and switchbacks. The trail system was punctuated by three developed areas that had a minimal footprint that include rustic cabins and water tanks. Collectively, these features were built in the rustic style with the intent to minimize the visual impact of the trails and its associated buildings and structures to further accentuate the picturesque qualities of the surrounding dramatic landscape. The design of these features incorporated techniques and materials that predispose a naturalistic vernacular design style that can be characterized by the use of native stone as the predominant exposed material in construction and the use of irregular, naturalistic forms, which ensured that the structures blended with the scenery, matching the color and character of natural rock outcrops.

The rustic or naturalistic character of the proposed historic district is evident in the following landscape characteristics: natural systems and features, spatial organization, land use, buildings and structures, circulation, topography and views and vistas, which are described in greater detail below.

The trail system was planned in order to take advantage of the topography and natural features that drew visitors to the crater, while also sighting the trails strategically to avoid major damage by the natural systems, including continually slumping earth and storm runoff during the rainy seasons. Responding to the steep topography, trails were strategically developed and/or improved to traverse the steep rim of the crater to provide panoramic views and visitor access to the crater floor. Most often trails were developed to avoid the most treacherous volcanic aa lava flows, which are difficult to traverse, while still providing access to natural features such as the Bottomless Pit and Pele's Paintpot. The alignment of the trails also took into account the natural drainage patterns along the crater walls in order to minimize erosion of the trails. Beyond trails, developed areas were strategically located to take advantage of protections provided by the natural topography, while remaining inconspicuous because of their rustic design. Significantly, all development within the crater was performed with great sensitivity, ensuring that built features would not detract from the beauty and solitude of the crater.

Serving as the principal feature of the Civilian Conservation Corps Haleakala Crater Trails District, the circulation system is defined by a series of trails designed by park planners and constructed by the NPS and the CCC between 1930 and 1941. During the period of significance, over 30 miles of trails were constructed in Haleakala Crater, although only 24.7 miles of the trail system contribute to the proposed district. The primary trail system includes Sliding Sands, Kaupo and Halemau'u Trails, among many other shortcut and spur trails located in the central crater. Following rustic design principles, the trails were designed to highlight crater views and associated volcanic features, while effortlessly blending with the natural environment. The depth of consideration put into the trails' design is evident in the trails

width, gradient, alignment and use of native stone materials.

The spatial organization of the proposed historic district is defined by the network of trails that connect the developed areas and bring visitors past the spectacular natural features. These trails provide visitor access to three developed areas in three distinct natural environments on the crater floor, including Holua, located in the northwest portion of the crater at the foot of the towering, 3,000-foot Leleiwi Pali; Kapalaoa, located in the southern reaches of the crater; and Paliku, at the eastern end of the crater that is defined by lush grass and ferns, overhanging forest trees, and a verdant cover located in the eastern extent of the crater. All three developed areas include several rustic style buildings and structures, which are accessible by trails that were constructed by the CCC. Today, the historic trails, cabins and associated developed areas continue to be used in the way that they were originally intended—providing visitor access and accommodation to the largely undeveloped interior of Haleakala Crater and its associated environs.

Due to the immense area that the trails covered within the crater, NPS designers included three developed areas out of the necessity of providing visitors with rest areas within the crater. Responding to issues related to climate, available materials and existing building traditions, NPS architects designed four nearly identical rustic style cabins with associated water tanks in Haleakala Crater in conjunction with the landscape architects' design of retaining walls, causeways and trails according to rustic design philosophy. Today, many of the park rustic buildings and structures from the period of significance remain, including four cabins, one footbridge, eight water tanks and 194 retaining walls. The trails within the crater display an overall character consistent with the design and style of the historic trail system. Together, these buildings and structures help convey the early design intent and aesthetic character, which contributes to the significance of the proposed historic district.

In response to the varied nature of the topography associated with Haleakala Crater, the manipulation of the landscape by the CCC required concentrated efforts along three trails—Halemau'u, Sliding Sands and Kaupo. The construction and/or improvement of these trails necessitated that each trail descend thousands of feet in elevation at a reasonable grade to reach their respective destination. In many cases, the use of tread cut and fill sections was required to negotiate the rough, steep terrain characteristic of locations near the rim and in Kaupo Gap. Today, switchbacks and stone retaining walls remain prominent features along portions of the trails. As a reflection of rustic design, great effort was taken to minimize the disturbance of the surrounding landscape. During trail construction, local materials were used to build retaining walls and switchbacks, ensuring that the trail would blend with the environment. In addition, the trail alignment hugged the natural contours and tread cuts were fashioned with sensitivity to the naturalistic design intent.

Views play one of the most critical roles of the visitor experience at Haleakala. To meet visitor expectations, the trails near the rim and throughout the crater were constructed and/or improved to capture optimal views of the volcanic topography with minimal distraction from the trail itself. Stone retaining walls were constructed using local lava stone to blend with the surrounding environment and switchbacks were aligned tightly to try to minimize visibility from the crater floor. Additionally, the low growing character of the largely native vegetation associated with the Alpine (aeolian) zone of the

crater ensured that views would not be blocked by their growth. Developed areas were sited toward the foot of the crater walls in order to have them be less of a visual intrusion on the crater floor. Both the location and style of the trail system was intended to highlight the natural views into and out of the crater.

Integrity

The CCC Haleakala Crater Trails District retains integrity as an intact rustic style trail system designed by park planners and constructed by the NPS and CCC during the years 1930 to 1941. The alignment of the primary crater trails, including Halemau'u, Sliding Sands and Kaupo, has changed very little since 1941. Functioning in the same capacity, the historic trails, cabins and associated developed areas continue to be used in the way that they were originally intended—providing visitor access and accommodation to the largely undeveloped interior of Haleakala Crater. Because the views that inspired the design and subsequent development of the crater trails system still remain, views and vistas as a landscape characteristic contributes to the setting, feeling and association of the proposed district. The manipulation of topography, which includes tread cuts, cuts and fills and switchbacks are intact. The vast majority of park rustic buildings and structures associated with the trail system and developed areas also remain from the period of significance exhibiting excellent rustic craftsmanship, the careful use and blending of local materials, and are outstanding examples of naturalistic design. Together, these contributing landscape characteristics and features help convey the design intent and aesthetic character of the proposed district.

The proposed district has undergone some subtle changes throughout the years, which have had only a minor effect on the integrity of the district. These changes are attributed to the steep topography, the highly erodible soils, and the high level of precipitation which have an ongoing effect on the Haleakala Crater trails. Since the 1930s when the trails were first developed and/or improved by the NPS and the CCC to the present, seasonal storms that produce heavy rains have repeatedly damaged the trails. Small sections of trail have been washed out and new drainage systems have been installed in an effort to stabilize the trail tread. Regardless of the extent or location of the damage, repair work was generally performed as part of trail maintenance in a manner that was compatible with its rustic character, preserving the overall form and character of the features within the district. It should be noted that routine maintenance typically addressed erosion and was limited to repairing damages.

The key characteristics that historically defined the historic trail system and developed areas retain all seven aspects of integrity including the location, design, setting, materials, workmanship, feeling and association.

Landscape Characteristic:

Natural Systems and Features

Natural systems and features are defined as the natural aspects that have influenced the development and physical form of the landscape. Among other aspects, it can include climate, geology, hydrology, soils, and native vegetation.

Geology

The following information concerning the formation of Haleakala Crater was adapted from the Haleakala National Park General Management Plan, 1995, 39-42 and the Archeological Overview and Assessment for Haleakala National Park, Island of Maui, 2007, 32.

Formation of Haleakala Crater

Haleakala Crater was formed and shaped by three periods of volcanic activity. In the earliest period, approximately one million years ago, a symmetrical shield similar to Mauna Loa (a dormant volcano located on the big island of Hawaii) was built of pahoehoe and aa lava at 8,500 feet above present sea level. During the next cycle, eruptions were more explosive in nature forming bulky cinder cones and extensive ash beds. Like Mauna Kea today, Haleakala was capped by a craterless mound of cinders, 2,500 feet high and studded with several lesser cones. This summit was about a mile east of the present Red Hill summit (10,023 feet) and about 2,000 feet higher than today.

As eruptions declined, running water cut deeply into the sides of the mountain and excavated four great valleys—Ke‘anae, Kaupo, Kipahulu, and Waiho‘i. Most of the eastern summit ridge was worn away; Kaupo and Ke‘anae valleys were near the summit and fused into a great depression. During the Hana Volcanic Series, volcanism again quickened at Haleakala, leaving behind the distinctive large flows and cones, which masked the divide that delimited the two great valleys. Cinders, ash, volcanic bombs, and spatter were blown from the vents forming multicolored symmetrical cones. Thus was created a water-carved depression 7.5 miles long, 2.5 miles wide, and up to 5,000 feet deep, partially filled by lava.

Today, earthquake records indicate that internal adjustments are still taking place in the earth’s crust—Haleakala could erupt again. Haleakala, in comparison to the volcanoes on the island of Hawai‘i, is representative of a more mature Hawaiian volcano. It has entered the “rejuvenated phase,” where the extrusion of lava is followed by a long erosion interval. There follows subsequent activity and then an erosional phase.

Lava Flows

Within the boundaries of Haleakala National Park, the most recent volcanic activity occurred approximately 800 years ago in the eastern half of the crater where lavas emerged from fissures on the north crater wall below Hanakauhi Peak and then flowed east toward Kaupo Gap. In the west half of the crater, flows originating approximately 1,000 years ago erupted from Halali‘i and Ka Lua o ka ‘O‘o cones. Today, Holua Cabin sits on the edge of the flow from the latter cone. Despite the most recent activity described above, the majority of the crater floor is covered by lava flows that occurred over the course of the past 5,000 years (Archeological Overview and Assessment for Haleakala National Park, Island of Maui, 2007, 32).

Most basalt lavas are aa or pahoehoe types, which are low-viscosity flows. In Hawaiian, aa loosely means chunky lava. It is characterized by a rough or rubble-like surface composed of broken lava blocks called clinker. The word pahoehoe, like aa, is a Hawaiian word for lava emitted in the liquid state. According to Sherwin Carlquist, “the forms taken by pahoehoe depend on the conditions under which it emerges and upon its chemistry. If rapid escape of gas cools the pahoehoe, it may change into aa. Hotter pahoehoe flows as highly liquid narrow ripples, often described as ‘ropy,’ whereas somewhat cooler pahoehoe turns into crass, bulky folds. Pahoehoe usually contains gas bubbles, but these are ordinarily smaller and less numerous than those of aa.” Pahoehoe flows, with their smooth crusts, are also less inviting for plant growth than are aa flows (Carlquist, 1980).

Cinder Cones

Numerous cinder cones are located in Haleakala Crater. Largely concentrated in the western and central portions of the crater, cinder cones are small volcanoes formed by the accumulation of ash and cinders around a small volcanic vent. Serving as character-defining features of the crater, Surveyor Alexander (1870: 46) described the cones in his landmark survey of 1869: ‘...the sixteen crater cones, of different colors, gray, red and black ... I ascended several of these cones in the course of my triangulation and found the highest to be over 750 feet in height above its base. Another measured 390 feet, and several are over 200 feet in height. They are composed of light scoria and cinders, generally of a deep reddish color, but two are of a peculiar gray tint, and others nearly black’ (Archeological Overview and Assessment for Haleakala National Park, Island of Maui, 2007, 32).

Responding to the steep topography, trails were strategically developed and/or improved to traverse the steep rim of the crater to provide panoramic views and visitor access to the crater floor. Developed areas within the crater were sited in strategic locations to take advantage of protections provided by the natural topography, while remaining inconspicuous. Crater trails were developed to avoid the most treacherous volcanic aa lava flows, which are often extremely difficult to traverse, while still providing access to natural features such as the Bottomless Pit and Pele’s Paintpot. All development within the crater was performed with great sensitivity, ensuring that built features would not detract from the beauty and solitude of the crater.

Unique Volcanic Features

In addition to cinder cones and lava flows, Haleakala Crater also contains an array of unique volcanic features, which are accessed by park trails, most of which were built by the CCC. These features include, a small spatter vent, resembling a holding pen for livestock named Ka Pa Pua’ao Pele or Pele’s Pig Pen, located in the central crater. It was named in recognition of its legendary owner, Pele, the Hawaiian volcano goddess whose fiery activity created the volcanic islands of Hawai’i. Another feature, Kawilinau also known as the Bottomless Pit, is also located in the central crater. Plunging 60 or 70 feet straight down, Kawilinau is believed to

be the place where Pele's sister Kamakokahai, goddess of the surface of the sea, attempted to force her way into the valley in order to destroy Pele's fires. Located nearby, Pele's Paint Pot is yet another feature named for the goddess; it owes the beauty of its chaotic splashes of rich color to the various by-products of volcanic activity. Yellows come from sulphur deposits, and the various shades of red result from oxidation of iron (Paragraph adapted from Jim Mack's "Haleakala: The Story Behind the Scenery," 1992, 15).

Soils

The following information concerning soils was adapted from the Haleakala National Park General Management Plan, 1995, 42-43.

The widely ranging climate in Haleakala National Park has given rise to a variety of soil types, depending primarily on the amount of precipitation and drainage. In the crater, where annual precipitation ranges from less than 30 to 200 inches, relatively unweathered, bedded cinders, pumice and ash are associated with cinder cones. Rock rubble slides are a common occurrence on steep slopes within the crater. The west and south flanks of the summit from 8,000 to 10,000 feet consist mostly of sparsely vegetated rough, irregular aa lava with little or no developed soil. Much of the inner crater is covered with volcanic stones and boulders covering basalt and andesite lava flows. In places, young aa lava can be found with a thin covering of volcanic ash or it may be directly exposed as clinker, hard, glossy, sharp masses creating rough terrain difficult to traverse. The topography is very steep, broken by intermittent drainage channels. On the east flanks of the crater, in Kipahulu Valley where annual rainfall ranges from 150 to 300 inches, volcanic ash, cinders and lava have weathered to form well developed, sometimes deep, silty clay soils.

Soil or relative lack thereof within the crater played an important role in the historical development of the crater trails system. In a landscape defined by its volcanic past, park laborers overcame extremely difficult conditions while constructing and/or improving the trails. Within the interior of the crater, laborers built trails through large, rough aa flows, which required immense effort. In many cases, trails were aligned to avoid the most substantial aa flows following the path of least resistance when possible; however, absolute avoidance was impossible. In contrast, in other areas of the crater, laborers aligned trail segments across barren cinder fields, encountering few obstacles. While minimal resistance was encountered in these areas, the true challenge was maintaining the alignment through episodes of wind and rain, which inevitably changed the trail through time.

Climate

Weather at the summit as well as within the crater is unpredictable and can rapidly change. At higher elevations of Haleakala National Park temperatures are generally much cooler and are windy, cold and misty. The crater floor sits several thousand feet lower than the summit and is sheltered from both trade winds and kona storms by the crater walls. As a result of its

elevation, the crater floor is relatively dry due to its location above the inversion layer. While occasional heavy rains deluge the crater, the rain is quickly absorbed so there are no permanent streams. As a result of the relatively dry conditions, very little vegetation grows in the crater. In contrast, Kaupo Gap located at the eastern end of Haleakala Crater is characterized by heavy cloud cover, which flows into the area through a gap in the southern wall of the crater. The cloud cover, which often produces condensation, permits lush plant growth (Carlquist, 1980).

The dry climate and relative lack of water that characterizes significant portions of the crater likely influenced the siting of developed areas in the crater. As a result of the scarcity of water, planners may have situated the cabins in locations with known sources of water nearby. Historic maps indicate the presence of a spring near Kapalaoa Cabin. Furthermore, park staff indicated that water for Holua Cabin came from a surface spring, which was located near the cliff face. Not surprisingly, Paliku Cabin was also located where natural sources of water were available. Despite the presumably undependable and seasonal availability of natural water sources in the crater, the dry climate necessitated the construction of water tanks at each cabin. Today, these structures continue to serve in their original capacity so that visitors can enjoy Haleakala Crater.

As a result of the steep topography and highly erodible soils, the climate has a significant impact on the Haleakala Crater trail system. Since the 1930s when the trails were first developed and/or improved by the CCC to the present, seasonal storms that produce heavy rains have repeatedly damaged the trails. Throughout the years, small sections of trail were washed out and new drainage systems were installed in an effort to stabilize the trail tread. Regardless of the extent or location of the damage, repair work was generally performed as part of trail maintenance. Significantly, routine maintenance of the crater trails does not diminish the integrity of the trail system because the maintenance is in response to erosion and is limited to repairing damage in order to keep the trail system functional to encourage pedestrian access into the crater.

Native Vegetation

Haleakala has a tremendous variety of habitats, which includes alpine deserts, subalpine shrubland and grasslands, dry forests, bogs, leeward forests, rain forests, and coastal strand vegetation. According to the 1995 Haleakala National Park, General Management Plan (GMP), “the park vascular flora includes about 650 species of which 370 are native. Of the native species, about 90 percent are endemic to the Hawaiian Islands and 25 percent are endemic to Maui. Adaptation over millions of years in isolation from mainland plants has resulted in many bizarre and beautiful forms, such as the silversword group, which have little resemblance to relatives found outside Hawai‘i” (HALE GMP, 1995, 43). The proposed CCC Haleakala Crater Trails District includes features associated with the alpine, subalpine shrublands, subalpine grasslands, leeward shrublands and leeward forest.

The following information concerning vegetative habitats is adapted from A.C. Medeiros, L.L. Loope and C.G. Chimera's "Flowering Plants and Gymnosperms of Haleakala National Park", 1998, 4-8.

Alpine (aeolian) zone

Haleakala's alpine zone occurs above 6,560 feet of elevation within the cinder-dominated crater and above 8,530 feet on the older, outside western slope of the volcano. The alpine zone on Haleakala is sparsely vegetated and has low plant species diversity. The alpine zone landscape consists of rough broken lava features, cinder cones, and cinder fields. In Haleakala Crater, the alpine zone occurs adjacent to and sharply defined from relatively dense subalpine vegetation on older and more developed substrates.

The relatively few plant species of this zone comprise a subset of typical subalpine species (*Dubautia menziesii*, *Styphelia tameiameia*) together with unique characteristic elements (*Tetramolopium humile*, *Argyroxiphium sandwicense* subsp.). The native bunchgrass *Deschampsia nubigena*, found in a number of native plant communities, is the most common native grass; other grasses, *Agrostis sandwicensis* and *Trisetum glomeratum*, are locally found primarily in the alpine zone.

The native Haleakala silversword (*ahinahina*) also flourishes in the alpine zone. Silversword are uniquely adapted to thrive in Haleakala's harsh alpine desert environment. The plants have a shallow root system, which allow them to catch moisture in the porous, loose cinders. They also have a long tap root that serves to anchor the plant during high wind events. The dense covering of silvery hairs on the leaves, which inevitably influenced its name, conserves moisture and protects the plant from the intense, high elevation sun.

Generally, non-native species are few, limited in cover, and largely restricted to habitats modified by humans. Characteristic alien species include gosmore (*Hypochoeris radicata*), evening primrose (*Oenothera stricta*), and rescue grass (*Bromus willdenowii*). Cheatgrass (*Bromus tectorum*) and telegraph plant (*Heterotheca grandiflora*) are invasive in cinder flats and slopes in the crater.

Subalpine shrublands

Subalpine shrublands of Haleakala occur primarily on the western and northwestern flanks of the volcano extending from just below the park boundary at 6,724 feet up to where it grades into the alpine zone at approximately 8,530 feet. Subalpine shrublands also occur on the southern cliffs, upper rim and in older kipukas of Haleakala Crater.

The most common species of the subalpine zone is the leathery, small leaved shrub *pukiawe* (*Styphelia tameiameia*). The tallest tree-shrub of the subalpine shrublands is *mamane* (*Sophora chrysophylla*). Other common species include 'ohelo (*Vaccinium reticulatum*),

kupaoa (*Dubautia mensiesii*), pilo (*Coprosma montana*), kukaenene (*Coprosma ernodeoides*) and hinahina (*Geranium cuneatum* subsp. *tridens*). The lava flows offer an environment with challenges such as extremely porous soil, intense sunlight, freezing temperatures, and low rainfall that native plants are uniquely adapted to meet (Mack, 1992). Non-native grasses, especially velvet grass (*Holcus lanatus*), are common and persistent between native shrubs in lower elevations in previously disturbed areas.

In the windward, wetter regions of the subalpine zone, some areas are currently dominated by non-native grasses, especially velvetgrass, but also include other species such as sweet vernal grass (*Anthoxanthum odoratum*) and orchard grass (*Dactylis glomerata*).

In Kaupo Gap, several otherwise distinct plant communities sometimes overlap forming unique species assemblages. Subalpine shrublands intergrade with leeward shrublands (central Kaupo less than 5,600 feet), with leeward forests (eastern and western cliffs), with rain forest (upper eastern Kaupo near Paliku), and with koa forest (lower eastern Kaupo). The cliffs of upper western Kaupo provide habitat for several endangered plant species.

Subalpine grasslands

Large individual tussocks of the endemic bunchgrass species *Deschampsia nubigena*, with diameters up to three meters across, dominate high elevation grasslands found only on the islands of Maui and Hawai'i. Within the park, these *Deschampsia* grasslands occur most notably in the Kalapawili grasslands, but also at Kuiki and in small areas within the crater in mostly cinder substrates on the outer northwestern slopes. On the northeastern outside flank of the crater, the Kalapawili grasslands are the highest elevation native grassland in the state and recognized as a unique Hawaiian plant community.

Leeward shrublands

In Kaupo Gap, leeward shrublands were probably extensive and mixed with stands of dryland forest trees. Beginning in the early 1800s and continuing into the mid-1980s, feral goats (*Capra hircus*) ranged freely through this area and degraded the native shrublands to the point that few native species survived in accessible habitats. Intensive goat browsing opened up and converted large tracts of leeward shrublands into non-native herblands. Initially, after the control of goats in 1985-1986, non-native grasses proliferated extensively in these areas, especially rattail (*Sporobolus africanus*) and Natal redtop (*Rhynchelytrum repens*). Subsequently, native shrubs such as 'a'ali'i (*Dodonaea viscosa*), pukiawe (*Styphelia tameiameia*) and ulei (*Osteomeles anthyllidifolia*) are recovering by establishing seedlings and developing young vegetative shoots from old stumps.

Leeward forest

Leeward forests of the Hawaiian Islands, often called dry forest or dryland forest, have been

decimated to the point that only relictual stands now survive. The dryland forests of Haleakala National Park were in times of pre-human contact probably more extensive and diverse than most imagine. Today, however, few areas of dryland forest remain within the park, mostly on the cliffs and steep slopes of Kaupo Gap. One remnant stand, located along a steep ridge in eastern Kaupo Gap, contains a small but rich assemblage of dryland forest trees. Most of these species do not otherwise occur in the park or in nearby areas.

Introduced Vegetation

As a result of the relatively harsh environment associated with the majority of Haleakala Crater, vegetation management did not play an overwhelming role in the development of the trail system during the period of significance. Largely composed of low-lying, mixed scrub and grasses, the character of the vegetation associated with the western and central portions of the crater remains consistent with what was present historically. Furthermore, the character of the lush vegetation located at the Paliku Developed Area and Kaupo Gap remains generally consistent with what was present during the historic period. Despite the relative consistency of the character of vegetation in the crater, changes have occurred as a result of a number of factors; including a long history of use by stock animals. Changes have also occurred a result of the presence of the now eradicated feral goat population, which occupied the crater and grossly disturbed many native plant communities.

Non-Native Vegetation

In 1933, vegetation was planted along trails to reduce erosion and scarring from previous trail construction activities. One year later, in 1934, new lawns were installed at unspecified locations throughout Haleakala National Park. While it remains unknown whether or not lawns were planted in the crater at this time, lawns were eventually established at Paliku, Kapalaoa and Holua Developed Areas.

Today, the lawns associated with the cabins are largely composed of Kikuyu Grass (*Pennisetum clandestinum*). Kikuyu grass is non-native, but has been naturalized in Hawaii and is commonly associated with grazing, which was a historic land use within the crater. The presence of a lawn is seemingly appropriate at Paliku as a result of the lush adjacent vegetation, however, it is in stark contrast to the adjacent cinder cones and fields of aa in proximity to the Holua and Kapalaoa Developed Areas. As a result of their important role associated with the setting of each cabin, the grass lawns at Paliku, Kapalaoa and Holua contribute to the character of the proposed district.

In the late 1940s, Kikuyu grass was planted to reduce eroding trails and roadsides in Haleakala National Park (Larson, 1969, 13). Today, the grass is also found in developed areas of the park, such as in the Headquarters Area and the RM/Maintenance Area as well as near the park's southern boundary in Kaupo Gap, due to its close proximity to Kaupo Ranch. Planted after the period of significance to deter erosion, Kikuyu grass located along the historic trail

system does not contribute to the proposed district (Smith, 1980, 62-63).

European Plum Trees

Additional vegetation changes near Paliku Cabin and along Kaupo Trail include the introduction of European plum trees. According to park staff, the plum trees were planted in the early 1950s by Frank Freitas. Over the course of the next several decades, Frank led trips into the crater and likely planted the trees to harvest the fruit during his many trips. Today, three trees are located behind Paliku Cabin. Two are situated on the right side of the trail leading to the pit toilet and the remaining tree is directly behind the cabin. In addition, Freitas also planted the two European plum trees located at the 5,000 foot elevation of Kaupo Trail (E-mail correspondence between Cortney Cain and Ron Nagata, October, 2008). Planted after the period of significance, the European plum trees do not contribute to the proposed district.

Natural systems and features significantly influenced the historic alignment of the trail system and the construction of developed areas within the crater. Furthermore, climate, soils, vegetation and associated volcanic features, such as cinder cones and lava flows also influenced the development of the proposed district. As a result, natural systems and features as a landscape characteristic contribute to the CCC Haleakala Crater Trails District.

Spatial Organization

Spatial organization is defined as the three-dimensional organization of physical forms and visual associations in the landscape, including the articulation of ground, vertical, and overhead planes that define and create spaces.

The spatial organization of the proposed CCC Haleakala Crater Trails District is defined by nearly 24.7 miles of contributing historic trails, which provide visitor access to three developed areas in the crater. These areas include Holua, located in the northwest portion of the crater; Kapalaoa, located in the southern reaches of the crater and Paliku, located in the eastern extent of the crater. All three developed areas include several rustic buildings and structures, which are accessible by trails that were developed by the CCC.

Rustic Planning

Primarily composed of land designated as wilderness; Haleakala Crater is characterized by limited development, while moderate development is found at the summit and near the crater rim. The sensitive development of the crater and more intense development near the rim reflect a rustic attitude toward early park planning, which was often manifested in the creation of two zones within a park. Typically, one area was characterized as the “developed” zone, that contained all utilitarian structures and visitor amenities for the casual park visitor. The second area was reserved as an “undeveloped” zone, a more remote area that provided only primitive facilities for adventurous visitors to hike and/or camp. The physical separation of developed from undeveloped areas remains a hallmark of early park planning. The proliferation of this idea is clearly illustrated at Haleakala where the wilderness experience was an important value in the planning and subsequent development of a rustic infrastructure in Haleakala Crater

(Paragraph adapted from "Hawai'i National Park: Planning and Development through World War II" Draft Multiple Property Nomination prepared by Carey and Co.).

Trails

General development within the crater was directed by the natural topography of Haleakala Crater. As a result, many trails were built in response to natural features, highlighting those of particular interest, while avoiding lava flows and cinder cones that were difficult to navigate.

The linear district is almost exclusively composed of trails that were constructed and/or improved by the CCC during the period of significance. The crater's primary trails, Sliding Sands and Halemau'u generally extend in an east/west orientation, descending several thousand feet from the rim to the crater floor. Halemau'u Trail commences in the northwest corner of the park, first heading in a southerly direction and then east approximately 10.3 miles through native shrubland and cinder desert to the Paliku Developed Area. Sliding Sands Trail begins at Haleakala Visitor Center at an elevation of 9,778 feet and continues east along the crater's south side. From the Sliding Sands trailhead, the trail extends through cloud forest, cinder desert and shrublands, terminating at the junction of Halemau'u Trail on the eastern side of the crater. Kaupo Trail, also serves as an important component of the trail system. Located on the east side of the crater, the 7.1 mile trail traverses the steep, rocky terrain in Kaupo Gap in a north/south orientation. In addition, several smaller loop and spur trails are located in the crater. Some of these trails were developed by the CCC to provide access to unique geologic features, while newer trails were constructed as shortcuts to connect the main trail systems in central portions of the crater.

Developed Areas

Three developed areas, each containing a rustic visitor cabin as well as several water tanks are located on the crater floor. The cabins and associated developed areas were sited in prime locations that took advantage of protections offered by natural topography, while also considering viewsheds and the availability of local natural resources such as water.

The Holua Developed Area is located in the northwest corner of Haleakala Crater at an elevation of 6,490 feet. Holua, the Hawaiian word for "dryland sled," is situated within the larger Haleakala Wilderness Area and is a 50-acre non wilderness enclave. Characterized by two discreet areas of development, the area directly associated with the Holua Cabin includes the cabin, a small storage shed, water tank, water spigot, two horse hitches and two pit toilets. Due south and up a short, but relatively steep incline, lies a secondary development, which includes a wilderness campground (one of two designated wilderness campgrounds in the crater), pit toilet, water tank, the shed and a fenced corral. The secondary development is not readily visible from the Holua Cabin area and the majority of extant features were established after the period of significance and do contribute to the proposed district.

The Kapalaoa Developed Area is located in the south central portion of Haleakala Crater at an elevation of 7,250 feet. Kapalaoa, meaning "the whale tooth," is situated within the larger Haleakala Wilderness Area and is a five-acre non-wilderness enclave. Characterized by two discreet areas of development, the area directly associated with the Kapalaoa Cabin includes the cabin, a small storage shed, a water tank, two horse hitches, wood plank retaining wall and a pit toilet. A small secondary developed area is located just west of the cabin and includes three historic water tanks and a stone retaining wall located on an adjacent slope. Without a designated wilderness campground area and no corral, Kapalaoa is the smallest developed area in Haleakala Crater.

The Paliku Developed Area is located on the eastern side of Haleakala Crater at an elevation of 6,380 feet. Paliku, meaning "vertical cliff," is situated within the larger Haleakala Wilderness Area and is a 50-acre non wilderness enclave. The area is characterized by two discreet areas of development, which include the Paliku Cabin visitor area and the Paliku Patrol Cabin area, which supports park staff and animals. The area associated with Paliku Cabin includes the cabin and attached small corrugated metal storage shed, water tank, horse hitch, pit toilet, water spigot and the wilderness campground (one of two designated wilderness campgrounds in the crater). A grass covered footbridge provides access to the Paliku Patrol Cabin, connecting the two developments. The Paliku Patrol Cabin area includes the cabin, two water tanks, corral, horse hitch, Paliku stable and a fiberglass portable toilet.

Today the proposed CCC Haleakala Crater Trails District continues to retain the same spatial patterns as it did during the period of significance. The overall alignment of Halemau'u, Sliding Sands and Kaupo Trails has changed very little since 1941, although several new short cut trails have been developed in the central crater. Despite these minor changes, the trail system continues to provide visitor access to the crater floor and associated developed areas at Kapalaoa, Holua and Paliku.

Land Use

Land use is defined as the principal activities in the landscape that have formed, shaped, or organized the landscape as a result of human activity.

Prior to the improvement and development of the trail system by the CCC, the existing crater trails were used by Native Hawaiians and in the early twentieth century by tourists and ranchers who drove cattle through the crater. The construction of Haleakala Highway in 1935, which provided convenient visitor access to the rim of Haleakala Crater, resulted in the construction of new trails and improvement of existing trails within the crater. While the primary land use during the period of significance was recreation, the crater was briefly used by the Army during World War II. The Army utilized the existing cabins constructed by the CCC; however no significant changes were made to the developed areas. During this time and to the present, the trails continued to be used for recreational hiking and horseback riding as occurred during the period of significance.

Developed Areas

Three developed areas are located within the crater—Paliku, Kapalaoa and Holua. In 1937, the CCC constructed a visitor cabin at each developed area. They also constructed a patrol cabin for use by park staff at Paliku. Today, Haleakala National Park offers no additional visitor accommodations within the crater other than those constructed during the period of significance. As a result, backpackers continue to use the cabins for overnight accommodations as was originally intended.

In addition to cabins, wilderness camping areas and pack animal facilities are located within the crater. Two wilderness camping areas have been developed in the crater—one at Paliku and the remaining at Holua Developed Area. Each area consists of a mown-grass area big enough for approximately ten tents and a sign to mark the location. These camping areas were designated in the 1970s. While these camping areas were not established by the CCC, they support visitor use activities within the crater.

Pack animal facilities for use by the NPS are also located in crater at the Paliku and Holua. Corral fencing has been in various configurations at the developed areas since at least World War II. Similar to the wilderness camping areas described above, these facilities were constructed after the period of significance; however, the CCC utilized these developed areas in the same way as a place to stay the night and keep pack animals while laborers conducted maintenance work on the trails. Continued use of pack animals by the NPS is an essential component of the maintenance of trails and visitor facilities within the crater.

Today, the historic trails, cabins and associated developed areas continue to be used in the way that they were originally intended—providing visitor access and accommodation to the largely undeveloped interior of Haleakala Crater and its associated environs. Recreational hiking continues to be the primary visitor use; however, horseback riding is also permitted on trails. Based on field observations, commercial horseback riding tours are likely attributing to trail widening and erosion problems on Sliding Sands and Halemau'u, which is negatively impacting the historic character of the trail. Despite these issues, the trail system and its associated features retain integrity, providing visitors with the opportunity to intimately experience the beauty of Haleakala Crater.

Buildings and Structures

Buildings are defined as those features that are built primarily for sheltering any form of human activity. Structures are defined as features constructed for purposes other than sheltering human activities.

Efforts toward the development of visitor facilities located in the crater began as early as 1935. By the end of 1936, a standardized "Haleakala Shelter Cabin" was developed and the trail system was upgraded. Less than ten months later, four shelter cabins were constructed by Civilian Conservation Corps (CCC) laborers (Carey and Co., Draft Amendment to the Haleakala National Park Crater Historic District, 2005). To facilitate construction activities, two spur camps were established in the crater. The crater camp sites operated only during the summer and were equipped with water storage tanks. While occupying the crater, enrollees built several cross-crater trails, realigned and rebuilt the Halemau'u, Sliding Sands and Kaupo

Trails, constructed four cabins with water storage tanks, and cleaned and located other crater water sources (Jackson, 1971, 24-25).

Today, the CCC Haleakala Crater Trails District encompasses three developed areas and nearly 26 miles of historic trails, which includes four cabins, one footbridge, eight water tanks and 194 retaining walls. Designed by the NPS and constructed by the CCC, these buildings and structures help convey the early design intent and rustic character, which contributes to the significance of the proposed historic district. According to Albert H. Good in *Park and Recreation Structures*, the rustic style can be described as “the use of native materials in proper scale, and through the avoidance of severely straight lines and over sophistication, give the feeling of having been executed by pioneer craftsman with limited hand tools. It thus achieves sympathy with natural surroundings and with the past.” At Haleakala, the cabins, trails, water tanks, retaining walls and associated features in the crater were built in the rustic style with the intent to minimize the visual impact of the structures and accentuate the picturesque qualities of the surrounding dramatic landscape. The design of these features incorporated techniques and materials that predispose a naturalistic vernacular design style. This included the use of native stone as the predominant exposed material in construction and the use of irregular, naturalistic forms, which ensured that the structures blended with the scenery, matching the color and character of natural rock outcrops and surrounding terrain.

Responding to issues related to climate, available materials and existing building traditions, NPS architects likely adopted a local Hawaiian architectural style developed in the 1920s to inform design in Haleakala. Typical features of Hawaiian National Park Service rustic buildings include “widespread use of stone or lava rock walls, columns, chimneys, or planters; prominent metal-clad hip or gable-on-hip roofs with wide eaves; a large number of windows, usually casement or double-hung; horizontal wood clapboards in a pattern of alternating sizes; and varying styles of porches” (Carey and Co., *Draft Amendment to the Haleakala National Park Crater Historic District*, 2005 and *Hawaiian Style Cottages*, State Historic Preservation Division website: <<http://hawaii.gov/dlnr/hpd/hpcal95.htm>>). Cabins at Kapalaoa, Holua and Paliku exhibit a significant number of the features described above, clearly demonstrating their association with broader rustic development and park planning within Haleakala Crater during the period of significance.

Holua Developed Area

Holua Cabin (Contributing) (LCS 57562, CR-04)

The following description was adapted from Carey and Co., *Draft Amendment to the Haleakala National Park Crater Historic District*, 2005.

Holua Cabin is a 30-foot long (north-south) by 17 foot-wide (east-west) rectangular, one-story, wood-framed building. Above the stone foundation, the walls are clad with alternating 1” x 12” and 1”x 6” rough sawn clapboards, which are adorned with simple, flat wood trim. The hipped

roof is clad with corrugated metal and has one-foot deep overhangs with open eaves. In addition, a fieldstone chimney and a metal chimney are located on the west end of the building. Each steel casement window consists of three sashes, although the number of lites per sash varies between six and eight depending on the location. For example, on the main elevation, the windows have six-lites per sash on the west end, while on the eastern end of the building the windows have eight-lites per sash. Centered on the east elevation and approached by three stone steps, the entry door consists of three vertical planks. A similar door is located at the south end of the west elevation. Early photos of the structure show a two-panel door with a four-lite glazed upper panel.

The 510-foot interior consists of three spaces. The primary space contains four built-in, three-tiered wooden bunk beds, accommodating 12 people. The south end is partitioned off to create a kitchen area, with a sink, cabinets and wood counter, and a wood-burning stove. A small storage room is in the southeast corner. Floors are wood tongue-and-groove, 3 1/2 inches wide, and walls and ceilings are wallboard (this may be an alteration, since the 1943 inventory lists interior walls as “frame”).

The cabin has undergone very little change since its construction in 1937. The NPS's List of Classified Structures (LCS) records indicate that the cabin was rehabilitated in 1950, although it is unknown what type of work was performed. Additional changes include a metal chimney, the replacement of the front entry door, the installation of metal bars across the windows in the late 1960s and the construction of a shed addition on the rear of the building in 1990. The most recent work occurred in 2007 with the repair and/or replacement in-kind of the cabin's siding and casement windows. Despite the minor changes that have occurred through time, the cabin retains sufficient integrity, contributing to the rustic character of the district.

Holua Water Tanks (2) (Contributing) (LCS 57563, H5-8)

Water from Holua Cabin is collected from a surface water spring in the nearby cliff face and stored near the cabin in a tank that was built by the CCC in 1937. Located at the north end of the west façade of Holua Cabin, the cylindrical water tank was constructed with 3 1/2-inch redwood vertical planks and six steel cables with turnbuckles. The water tank has a flat corrugated metal roof, a 5,000 gallon capacity and is eight feet in diameter and six feet high. It sits three feet off the ground on 4-inch by 4-inch posts on a stone foundation (Carey and Co. Draft Amendment to the Haleakala National Park Crater Historic District, 2005.) The water tanks were rehabilitated in 2006 (E. Gordon, Cultural Resources and Park Research Report, FY 2006).

A second, similar water tank is located on the north side of the Holua “Hilton” shed (LCS TBD). Water for the tank is collected from roof catchment. The contributing structure sits on a wood frame and was likely moved from its original location behind the cabin to the shed area to provide water for park staff and animals. A historic photo shows two water tanks located behind Holua Cabin in 1960. By 1968, however, the second water tank was no longer behind

the cabin.

Holua Rear Storage Shed (Non-Contributing)

The Holua Cabin area contains a number of associated features, which includes a rear storage shed, centered on but not attached to the west façade. The extant shed was constructed in 1990 and measures approximately ten feet by five feet and has a corrugated metal roof and brown painted T 1-11 siding. Constructed after the period of significance, this structure does not contribute to the proposed district.

Holua Horse Hitches (3) (Non-Contributing)

Three horse hitches are located in the Holua Developed Area. Two are located adjacent to the cabin, on the south and east elevations of the building. An additional horse hitch is located near the shed on the ridge above the cabin. The “u” shaped horse hitches range from ten to 15 feet long and are three feet high and were constructed using metal pipe. These non-contributing features support horse related activities in the crater and post date the period of significance.

Holua “Hilton” Corral (Non-Contributing)

A corral and associated pasture extends for approximately 450 feet south of the Holua “Hilton” shed. The corral is enclosed by a fence, which was constructed using several materials, including wood and metal posts as well as smooth heavy grade metal wire. The irregular fence encloses the north, south and east sides of the corral, while the steep slopes associated with the adjacent topography serves as a natural boundary on the west side of the corral. A gate is located at north end of the corral, which provides access to pasture as well as the shed, which is located within the fenced area. The non-contributing fence was likely constructed after the period of significance and does not contribute to the rustic character of the district.

Holua “Hilton” Shed (Non-Contributing)

The Holua Developed Area shed, affectionately named the “Hilton” by park staff is located on a small ridge southeast of the cabin within the fenced pasture area. The non-contributing shed measures approximately 12 feet by 24 feet and was constructed in 1962 (Law, n.d.; 1963 Master Plan). Since its construction, the building has undergone significant changes, including the enclosure of one of two bays to provide additional accommodations for park staff.

Today, the shed includes an enclosed area, which serves as sleeping quarters for park staff and one open bay, which provides storage. The primary enclosed area has a corrugated steel roof and sits on concrete block piers. The structure is clad with several materials; including red painted T-1 11 siding and plywood. The open bay was constructed using plywood as well as red and black corrugated steel. The west facing side of the bay remains open with no door and has a dirt floor.

Holua Pit Toilets (3) (Non-Contributing)

Three pit toilets remain extant in the Holua Developed Area. Two of the pit toilets continue to function, while the remaining toilet has been decommissioned, but remains onsite. All three pit toilets were built after the period of significance and serve as non-contributing features.

Today, two, one-stall pit toilets are located in the area immediately adjacent to Holua Cabin. One pit toilet continues to function, while the other is no longer utilized. The functioning pit toilet, which was built in 2001, is wood frame with painted brown wood horizontal cladding, designed to match the cabin. The decommissioned pit toilet is clad with T 1-11 painted beige siding and has a large rectangular ventilation shaft, which extends several feet above the roof. In addition to the pit toilets located near Holua Cabin, there is also a pit toilet located between the shed and wilderness campground. The structure is identical to the decommissioned pit toilet described above.

Holua Water Spigot (Non-Contributing)

A small rectangular stacked stone and mortar base supports a stainless steel water spigot, located a short distance southeast of Holua Cabin. The structure provides non-potable water for backcountry use and must be filtered prior to consumption. It was constructed in the 1980s by the NPS in association with the American Hiking Club and does not contribute to the proposed district.

Holua Wilderness Campground (Non-Contributing)

The Holua Wilderness Campground is located on a small ridge southeast of the cabin adjacent to the shed and fenced pasture area. The campground has no clear boundary and is characterized by tall grasses and scattered woody shrubbery, punctuated by small, flat rock outcrops. Visitor access is restricted to three nights, fires are not allowed and refuse must be carried out. Developed by the NPS in the 1970s, the campground and its associated features were built after the period of significance and do not contribute to the proposed district.

Kapalaoa Developed Area

Kapalaoa Cabin (Contributing) (LCS 57564, CR-01)

Kapalaoa Cabin is virtually identical to Holua Cabin, described above. The only exterior difference between the two cabins is Kapalaoa's entry approach, which contains four steps, rather than three.

The cabin has undergone very little change since its construction in 1937. The building was rehabilitated in 1962 and 1989, although it is unknown what type of work was performed

(LCS). Interior changes include the replacement of the kitchen's wood countertop with a plastic laminate countertop and the installation of metal bars across the windows in the late 1960s (Carey and Co. Draft Amendment to the Haleakala National Park Crater Historic District, 2005). Exterior changes include the replacement of the front entry door and the construction of a shed addition on the rear of the building. Despite the minor changes, the cabin retains sufficient integrity, contributing to the rustic character of the district.

Kapalaoa Water System (4) (Contributing) (LCS 57565, HS-9)

Water for Kapalaoa Cabin is collected from a roof catchment and a surface water spring in the nearby cliff face (i.e, Kapalaoa Spring) and stored in tanks that were built by the CCC in 1937. The Kapalaoa water system consists of four tanks. One water tank is attached to the rear façade of Kapalaoa Cabin. The cylindrical tank has a 5,000 gallon capacity and is 8 feet in diameter and 6 feet high. The tank is clad with 5-inch vertical boards, wrapped with five steel cables with turnbuckles posts and has a flat corrugated metal roof. It is supported above the ground on 4-inch by 4-inch vertical wood posts with diagonal bracing. The cabin's gutter system drains into the tank, thus explaining its proximity to the structure (Carey and Co. Draft Amendment to the Haleakala National Park Crater Historic District, 2005).

In addition, three water tanks are located on a slope west of the cabin on an earthen platform. Each tank is approximately three feet by 15 feet and is clad with 3 1/2-inch wide vertical boards, wrapped with steel tie rods. The tanks are elevated one to two feet, resting on substructures featuring 4-inch by 4-inch wood cross sleepers. Each tank features a flat corrugated aluminum roof. The tanks are linked to each other by a series of pipes, with one pipe coming into the tank from up-slope, and the second pipe leading from the cabins down-slope toward the cabin (Carey and Co. Draft Amendment to the Haleakala National Park Crater Historic District, 2005). The water tanks underwent rehabilitation/replacement in-kind work in 2006 (E. Gordon, Cultural Resources and Park Research Report, FY 2006). Historically, the tanks were accessed by a relatively steep foot trail that ascended a nearby wash. Today, the trail is difficult to locate as a result of damage caused by erosion and is a non-contributing, but compatible feature.

Situated in a prominent location overlooking the crater floor, the water tanks artfully blend with the surrounding landscape. Exhibiting qualities characteristic of the rustic style, the Kapalaoa water system contributes to the proposed district.

Kapalaoa Water Tank Platform (Non-Contributing)

The remnants of an "L" shaped retaining wall are associated with three historic water tanks. Located on a hillside a short distance west of Kapalaoa Developed Area, the retaining wall is visible in photographs as early as 1960 and was likely constructed by the CCC during the period of significance to support the earthen platform that the water tanks occupy. Constructed using local lava stone, the dry laid wall sits approximately three feet tall and is 15 feet long. Through

time, segments of the wall have experienced damage as a result of the growth of vegetation in its crevices and erosion. Due to a loss of integrity, the retaining wall is non-contributing, but compatible.

Kapalaoa Rear Storage Shed (Non-Contributing)

The Kapalaoa Cabin area contains a number of associated features, which includes a rear storage shed, centered on but not attached to the south façade. Historic photos illustrate the presence of a shed located behind the cabin in 1960. Records also indicate that a shed was constructed behind the cabin in 1962. A photo taken in 1968 shows a small corrugated metal shed located behind the cabin, very similar to the corrugated shed still located behind Paliku Cabin. Today, a shed clad with painted brown T-1 11 sits on the cabin's south façade. It measures approximately ten feet by five feet and has a corrugated metal roof (Carey and Co. Draft Amendment to the Haleakala National Park Crater Historic District, 2005). Constructed after the period of significance, this structure does not contribute to the proposed district.

Kapalaoa Pit Toilet (Non-Contributing)

Today, a one-stall pit toilet is located just east of Kapalaoa Cabin. The pit toilet is wood frame with painted brown T 1-11 siding and has a corrugated metal roof with a black rectangular ventilation shaft. Built in 2001, the structure is a non-contributing feature.

Kapalaoa Horse Hitches (2) (Non-Contributing)

Two horse hitches are located in the Kapalaoa Developed Area. One horse hitch was installed in 1948. Both horse hitches are located adjacent to the cabin, although one is located on the west side of the building and the other is located on the east side. The "u" shaped horse hitches range from ten to 15 feet long and are three feet high and were constructed using metal pipe. These non-contributing features were constructed to support horse related activities in the crater and post date the period of significance.

Kapalaoa Wood Plank Retaining Wall (Non-Contributing)

A modern wood retaining wall is located behind Kapalaoa Cabin. The structure consists of several lumber boards that are supported by four small metal pipes, which serve as anchors. Extending for approximately 30 feet, the one and one half-foot high wall stabilizes an earthen slope located behind the cabin. Built in the 1990s, the wall does not contribute to the proposed district.

Paliku Developed Area

Paliku Patrol Cabin (Contributing) (LCS 57558, CR-03)

Paliku Patrol Cabin is virtually identical to Kapalaoa Cabin, described above. One exterior difference between the two cabins is Paliku's entry approach, which contains two fieldstone quarry steps, rather than four. Paliku Patrol Cabin also differs from other cabins in the crater because its water tanks are located approximately 450 feet away from the cabin, rather than being immediately adjacent to the building (Carey and Co. Draft Amendment to the Haleakala National Park Crater Historic District, 2005).

The cabin has undergone very little change since its construction in 1937. The building was rehabilitated in 1951, although it is unknown what type of work was performed (LCS). Additional changes include the installation of metal bars across the windows in the late 1960s, the addition of a roof and solar cell and the construction of a shed addition on the rear of the building, which supports a shower and water heater. In 2001, the casement windows underwent repair/replacement-in kind work, while the most recent alterations occurred in 2007 when a new roof was installed on the cabin. Despite the changes, the cabin retains sufficient integrity to contribute to the rustic character of the district.

Paliku Cabin (Contributing) (LCS 57559, CR-02)

Paliku Cabin is virtually identical to Kapalaoa Cabin, described above. One exterior difference between the two cabins is Paliku's entry approach, which contains five steps, rather than four. Also, the interior floor plan of the cabin is mirrored, which makes it the only cabin in the crater with a significantly different interior arrangement. (Carey and Co. Draft Amendment to the Haleakala National Park Crater Historic District, 2005.) Unfortunately, historic records do not indicate why the floor plan was changed in this cabin.

The cabin has undergone very little change since its construction in 1937. The building was rehabilitated in 1950 and 1953, although it is unknown what type of work was performed (LCS). Additional changes include the construction of a wood frame lean to with a corrugated metal roof at the rear the cabin, the installation of metal bars across the windows in the late 1960s, the installation of a metal chimney, construction of stone facing and entry steps in 1980 and the repair and/or replacement in-kind of casement windows in 2000. Despite the changes, the cabin retains sufficient integrity to contribute to the rustic character of the district.

Paliku Footbridge (Contributing) (LCS 57561, HS-7)

The Paliku footbridge was constructed by the CCC in 1937 to provide access across a small streambed, located between Paliku Cabin and the Paliku Patrol Cabin. The historic footbridge sits approximately five feet high and has a ten foot span. The top of the bridge, or the walking surface, is three feet wide and characterized by a thick layer of mown grass. A short two-inch metal pipe railing is located on both sides of the footbridge. Underneath the grass walking surface is the support structure, which was constructed using fieldstones and unhewn timbers. A small amount of white mortar in some of the joints was also discovered during field investigations by Carey and Company. (Carey and Co. Draft Amendment to the Haleakala

National Park Crater Historic District, 2005).

Paliku Water Tanks (2/1) (Contributing/Non-Contributing) (LCS 57560, HS-6)

The following information has been adapted from Carey and Co. Draft Amendment to the Haleakala National Park Crater Historic District, 2005.

Three water tanks are located in the Paliku Developed Area. The tanks service two cabins. One water tank is attached to Paliku Cabin, while the two remaining tanks sit a short distance uphill from Paliku Patrol Cabin. The cylindrical, 5,000 gallon Paliku Cabin water tank is located at the rear, northwest corner of the structure. It is approximately six feet in diameter and approximately five feet high. The tank is clad with 3-3/4-inch vertical boards and wrapped with five steel cables with turnbuckles. It is supported above the ground on vertical wood posts with diagonal bracing. The cabin's gutter system drains into the tank, thus explaining its proximity to the structure.

The two tanks serving Paliku Patrol Cabin are located uphill from the cabin. Both are vertical redwood structures with steel tie rods and corrugated metal roofs. The closer of the two tanks is approximately seven feet tall with a diameter of approximately six feet. The second tank is larger, measuring approximately ten feet tall with a twelve foot diameter and sits on concrete pylons with sleepers. This redwood tank holds 10,000 gallons and was installed onsite in the 1970s by the NPS and does not contribute to the proposed district. The water tanks underwent rehabilitation/replacement in-kind work in 2006 (E. Gordon, Cultural Resources and Park Research Report, FY 2006).

As a result of their rustic design and association with the cabins, which support visitor use at the Paliku Developed Area, two of the three water tanks located at Paliku contribute to the proposed district.

Paliku Stable (Non-Contributing)

Constructed in 1962, Paliku Stable is located within the fenced boundaries of the corral adjacent to the Paliku Patrol Cabin (1962 Master Plan). The 12-foot by 24-foot shed is a wood frame structure, covered on three sides by corrugated metal sheeting. A large protective corrugated metal and wood roof structure was constructed over the existing stable at an unknown date. The roof structure extends into the pasture, providing the additional protection from the elements. Built using modern materials, the structure does not contribute to the proposed district.

Paliku Metal Shed (Non-Contributing)

A small, freestanding corrugated metal shed is located behind Paliku Cabin. It is situated under a lean to roof structure that is attached to the cabin. The gabled structure is clad with

corrugated metal and measures approximately four feet by eight feet. Built in 1962, it does not contribute to the proposed district.

Paliku Pit Toilets (2) (Non-Contributing)

Today, two pit toilets remain in Paliku, although both structures are relatively recent additions. Built in 2000, the pit toilet located behind Paliku Cabin is wood frame with painted brown T 1-11 siding and has a corrugated metal roof with a rectangular ventilation shaft. In addition, a green fiberglass portable toilet is located a short distance behind the Paliku Patrol Cabin. Of recent construction and/or installation, both of these structures do not contribute to the proposed district.

Paliku Horse Hitches (2) (Non-Contributing)

Two horse hitches are located within Paliku Developed Area. One hitch is located in front of Paliku Cabin, while the other is associated with the Paliku Patrol Cabin. (One horse hitch was installed in 1948.) The metal pipe horse hitches found at Paliku are slightly different in form than those located at other developed areas. While horse hitches in other crater locations are a simple “u” shape, the hitches at Paliku measure approximately fifteen feet long and have a vertical bar in the middle of the “u”, providing additional support. Installed after the period of significance, these structures do not contribute to the proposed district.

Paliku Patrol Cabin Corral (Non-Contributing)

In 1950, it was reported that a three-quarter of a mile-long fence for an enclosed pasture was constructed near Paliku. Today, the Paliku Patrol Cabin corral measures approximately one-half acre in size and is enclosed by a fence that was constructed using several different materials, including three-rail lumber boards, metal posts, cut log posts and heavy gauge metal wire. The northern side of the corral is enclosed with three-rail lumber fence, although in 1968, this portion of the fence was characterized by cut log posts strung with barbed wire. The remaining segments of the corral fence were constructed using metal posts, cut log posts and heavy gauge wire. One wooden gate is located on the northern side of the fence, allowing horses and mules access into the enclosed area. The non-contributing corral is associated with horse activities of park staff and post dates the period of significance.

Paliku Water Spigot (Non-Contributing)

A small, stacked stone and mortar base, which supports a stainless steel water spigot is located a short distance west of Paliku Cabin. Situated near the wilderness campground, the square-shaped structure provides non-potable water for backcountry use. It was constructed in the 1980s by the NPS in association with the American Hiking Club and does not contribute to the proposed district.

Paliku Wilderness Campground (Non-Contributing)

The Paliku Wilderness Campground is located on north side of the Paliku Access Trail, just west of Paliku Cabin. The campground has no clear boundary and is characterized by tall grasses and scattered woody shrubbery in an open meadow. Visitor access is restricted to three nights, fires are not allowed and refuse must be carried out. Developed by the NPS in the 1970s, the campground was built after the period of significance and do not contribute to the proposed district.

District-Wide Trail Features

Causeways (24) (Contributing)

A causeway is a path or trail raised above the natural level of the ground, which traditionally provides passage over a wet or marshy area. In Haleakala Crater, 24 causeways have been constructed in association with the Halemau'u, Sliding Sands and Kaupo Trails, providing a route over wet areas as well as across areas traversing aa flows that are particularly rough to navigate. Characterized by two parallel stacked lava stone walls and mixed cinder and stone tread, causeways generally range from three to four feet wide and ten to 30 feet long. Not surprisingly, as a result of the wet conditions associated with eastern side of the crater, the largest causeway was constructed along Kaupo Trail, measuring 60 feet long.

Serving as highly engineered structures, which required a large workforce to construct, it is likely that the larger, more substantial causeways were developed as part of the original trail system. Today, all 24 causeways contribute to the rustic character of the proposed district.

Check Steps (77/1193) (Contributing/Non-Contributing)

A total of 1,270 check steps are associated with trail development in Haleakala Crater. Check steps are "...rows of stones used to retain the treadway on an evenly sloped section of trail with a grade less than twenty percent. They are often used to rehabilitate a highly eroded area where the original trail surface has washed away and a gully has formed. Rows of stones are set perpendicular to the trail with no gaps in between individual stones. The checks are backfilled with rubble and then covered with a topcoat of tread material. To prevent failure of checks due to erosion or lack of maintenance, the bottom of each check stone is placed at an elevation below the top elevation of the preceding downhill row of check stones. The checks act as "hidden steps" underneath the tread surface, holding back, or "checking" the uphill infill material. These hidden features help preserve the even tread of heavily used trail, which was once a lightly used historic trail" (Chris Barter, "Jordan Pond Rehabilitation Project" in Preserving Historic Trails, 54).

Stone check steps occur with the most frequency in the crater with a total of 727 features recorded along the entire trail system. As a result of their compatibility with the original design

of the trail, 77 stone check steps contribute to trail system. These features demonstrate the use of local stone and craftsmanship generally consistent with historic construction standards. In addition, 650 non-contributing stone check steps are also found in the district. These features are characterized by the use of large, angular stones and visible tool marks, which do not reflect rustic design.

A total of 497 wooden check steps were constructed along Kaupo, Sliding Sands and Halemau'u Trails. Built using milled lumber boards strategically positioned into the earth, these modern features do not contribute to the character of the proposed district. Also, along sections of the Halemau'u Trail as well as the trail leading to the Paliku Developed Area, 46 check steps were constructed using a combination of wood and stone paralleling one another. According to park staff, these features were built after the period of significance by the Student Conservation Association (SCA) in the 1990s and do not contribute to the proposed district.

Water Bars or Check Dams (26/179) (Contributing/Non-Contributing)

Drainage is an important component of sustainable trail design. A total of 205 water bars are associated with trail development in Haleakala Crater. Also referred to as check dams, water bars are built in response erosion caused by surface water running down the trail. Similar to check steps, many of the water bars are likely associated with modern trail building activities; however, this type of feature may have been built during the historic period. Constructed using native lava stones, these features were intended to stabilize trail tread, although in many instances, has proven insufficient to deter trail erosion. Today, 10 wood water bars, 2 wood and stone water bars and 193 stone water bars are located along crater trails. Of these, 26 water bars were determined to be contributing and 179 are non-contributing. The 26 water bars are compatible with the original design of the trails. Non-contributing stone water bars are characterized by the use of large, angular stones and visible tool marks, which do not reflect rustic design. The use of milled lumber also does not reflect rustic design ideology.

Edging (8/32) (Contributing/Non-Contributing)

Edging or trail curbing is associated with trails in 40 different locations, scattered throughout the crater. Most often, edging is characterized by single row of lava stones demarcating the trail edge. In addition to demarcating the trail boundary, edging also inhibits erosion along the trail. Often placed on the surface, rather than being embedded into the earth, edging is easily displaced by humans as well as by natural events (Scott E. Travis, "Documentation and Preservation of Historic CCC Trails in Chiricahua National Monument, Arizona" in *Preserving Historic Trails*, 81). As a result of the relatively dynamic nature of this feature, it is likely that most trail edging located within the crater was positioned along the trails after the period of significance by park staff or visitors. Today, eight portions of trail edging have been determined to be contributing, while 32 segments of edging is non-contributing.

Rip Rap Trail Tread (Non-Contributing)

Rip rap trail tread is one of several built features that characterize particular segments of the Haleakala Crater trail system. Found in multiple locations, including along Sliding Sands Trail, the trail tread is concentrated along the upper three miles of Halemau'u Trail. It is distinguished by a solid laid rock tread that is locked into place by the careful placement of each rock against its neighboring rocks. Extremely resistant to erosion, this tread is impermeable to the effects of water as long as the drainage needs of each trail section are provided for (Stephen Griswold, "Trailwork Solutions in United States National Parks, Peru, and Nepal" in Preserving Historic Trails, 5).

Largely constructed between the 1950s and 1970s by NPS staff, 129 individual segments of rip rap trail tread are located within the proposed district (Eddie Grasa Oral Interview by Elizabeth Gordon, 2008). Composed of angular, local lava stone, the trail tread measures approximately two to four feet wide in most places. Along the upper reaches of the Halemau'u Trail, rip rap trail tread is practically continuous with segments measuring several hundred feet in length, while in other locations along the trail the tread is only a couple of feet long. In contrast, the rip rap trail tread found along portions of Sliding Sands, east of Kapalaoa, is markedly less substantial, averaging ten to 15 feet in length. It should be noted that the variability in length of the rip rap trail tread along Halemau'u Trail may be the result of erosion, which is due to the lack of sufficient drainage features along the trail. Through time, portions of rip rap trail tread have been lost causing additional damage to the trail tread and other associated features such as historic retaining walls.

While rip rap trail tread is commonly found along several crater trails, this type of built feature was constructed after the period of significance and as a result does not contribute to the proposed district.

Trail Specific Features

Halemau'u Retaining Walls (134/1) (Contributing/Non-Contributing)

Originating at an elevation of 7,990 feet, Halemau'u Trail traverses rugged topography as it descends approximately 1,000 feet over the distance of three miles to the crater floor. As a response to the steep topography, retaining walls were built along the switchbacks of the Halemau'u Trail during the period of significance. The stone retaining walls were constructed to support the outer edge of the trail and the back slope and in many cases, were designed to blend with the natural features they abutted. The form of the retaining walls varied according to the natural surroundings, often curving to follow the alignment of the trail. As a result of the relatively moist environment, many of the stone retaining walls are covered in white lichen identified as *Stereocaulon* sp. Also, as a result of the wet environment, dense vegetation envelops many walls along the trail. In some cases, the vegetation is so thick that it is difficult to determine if a wall lies underneath.

Today, 134 contributing retaining walls remain along the Halemau'u Trail. Many of the walls were constructed as vertical walls; however, six were constructed at a 45 degree angle, providing additional stability. Exhibiting a significant range of lengths and heights, the largest wall stretches over 100 feet, while the shortest wall is less than six feet in length. Wall height also varies from over 20 feet high to shorter walls measuring only one foot tall. In many cases, the height of the wall depends upon the grade of the fill slope. It should be noted that variable wall height and length may be the result of damage from by rock slides and erosion, causing walls which may have historically been continuous to appear as several individual walls.

Historic documentation suggests that mortar was used in the construction of retaining walls along the crater trail system, although little detail was provided. According to Eddie Grasa, ex HALE Trails and Road Foreman, the CCC utilized cement that was colored to blend with the rock walls (Eddie Grasa Oral Interview by Elizabeth Gordon, 2008). Evidence of the mortar was found on a retaining wall near Rainbow Bridge in 2008 and a sample was taken by park staff. Due to the steep topography, heavy vegetation and lichen growing on the walls it was difficult to determine to what extent mortar was used in the construction of the retaining walls and where. In addition, in 2008, evidence of modern mortar was found in two locations along the Halemau'u switchbacks.

In addition to those contributing retaining walls described above, one wall is non-contributing. The non-contributing wall was constructed after the period of significance and does not contribute to the proposed district.

Halemau'u Open Culverts (11) (Non-Contributing)

Erosion remains a significant problem on the Halemau'u Trail. To mitigate the damage caused by surface water runoff, 11 open culverts were constructed along the trail in areas where gullies and ravines intersect with the trail. Concentrated in the upper .7 of a mile of Halemau'u Trail near the trailhead, the open culverts average three to five feet wide and are characterized by two parallel rows of angular, bulky stone, which directs the water off of the trail surface. In several instances, rip rap trail tread was laid in between the rows of stone providing additional stability and durability. These modern features were constructed after the period of significance to deter the effects of erosion and are not compatible with the rustic character of the proposed district.

Halemau'u Gutters (4) (Non-Contributing)

Four contemporary gutters are located along the upper three miles of Halemau'u Trail near the trailhead. Constructed as a stone lined trough on the uphill side of the trail, the feature carries surface water off the trail. Built after the period of significance to deter erosion along the trail, the gutters do not contribute to the proposed district.

Halemau'u Steel Culverts (3) (Non-Contributing)

Three corrugated steel culverts are associated with Halemau'u Trail. One culvert is located a short distance southeast of Holua Cabin, while the remaining two culverts are located on the upper seven tenths of a mile of the trail as you approach the trailhead. The culvert on the crater floor near Holua is characterized by a small stacked stone headwall, which was installed in the 1980s by park staff, with the assistance of Young Adult Conservation Corps (YACC) crew. The remaining culverts on the Halemau'u Trail were installed in the 1970s by NPS staff (Eddie Grasa Oral Interview by Elizabeth Gordon, 2008). These features were installed after the period of significance to control trail erosion and do not contribute to the proposed historic district.

Halemau'u Horse Hitch (Non-Contributing)

A horse hitch is located adjacent to the Halemau'u Trail near the base of the switchbacks. The metal pipe "u" shaped horse hitch is approximately ten feet long and three feet high. The non-contributing feature was constructed to support horse related activities in the crater and post dates the period of significance.

Halemau'u Gate (Non-Contributing)

A three rail wooden gate is located at the bottom of the Halemau'u switchbacks on the crater floor. Constructed to contain horses and animals, the gate was installed after the period of significance and does not contribute to the proposed district.

Sliding Sands Retaining Walls (2/2) (Contributing/Non-Contributing)

Perhaps as a result of the dynamic nature of Sliding Sands Trail and the relative lack of building materials in the immediate area, few features were constructed along the upper 3.8 miles of the trail during the historic period. Two contributing retaining walls are located along the trail. Both features are relatively inconspicuous rubble walls that were constructed using coarse lava stone. One of the walls is situated in an area that is characterized by steep topography and an abundance of lava stone, which provided stone construction material to build the wall. As a result of their rustic construction and association with the development of Sliding Sands Trail, they contribute to the proposed district. It should also be noted that two additional retaining walls are located along Sliding Sands Trail and are non-contributing.

Sliding Sands Horse Hitch (Non-Contributing)

One horse hitch is located on the south side of Sliding Sands Trail on the canyon floor near the junction of the Ka Moa O Pele Trail (Horse Hitch Trail). The "u" shaped horse hitch is approximately ten feet long and three feet high and is constructed of welded metal pipe. The non-contributing feature was constructed to support horse related activities and post dates the period of significance.

Kaupo Retaining Walls (58) (Contributing)

Originating at an elevation of approximately 6,300 feet, Kaupo Trail traverses rugged topography and lush vegetation as it descends the east side of Kaupo Gap. The trail reaches the park boundary after dropping several thousand feet over the course of 3.7 miles. Beyond the park boundary the trail continues down several thousand feet to a road near the coast. As a response to the steep topography, 58 drylaid stone retaining walls were constructed along Kaupo Trail. The forms of the retaining walls vary in response to the natural surroundings, often curving to follow the alignment of the trail. The retaining walls are evenly distributed along the course of the trail, exhibiting a large range of lengths and heights. The largest wall stretches over 300 feet and is ten or more feet tall, while the shortest wall is less than ten feet in length and only two feet tall. In many cases, the height of the wall depends upon the grade of the fill slope.

The vast majority of the retaining walls were constructed as vertical walls; however, at least one wall was constructed at a 45 degree angle, which provides additional stability. As a result of the relatively wet environment, many of the stone retaining walls are covered in white lichen identified as *Stereocaulon* sp. Also, due to the wet environment, dense vegetation envelops the majority of the walls located along the trail. In some cases, the vegetation is so thick that it is difficult to determine if a wall lies underneath.

Character-defining Features:

Feature: Retaining Walls (194)

Feature Identification Number: 133948

Type of Feature Contribution: Contributing

Feature: Causeways (24)

Feature Identification Number: 133950

Type of Feature Contribution: Contributing

Feature: Check Steps (77)

Feature Identification Number: 134828

Type of Feature Contribution: Contributing

Feature: Check Dams or Water Bars (26)

Feature Identification Number: 134830

Type of Feature Contribution: Contributing

Feature: Edging (8)

Feature Identification Number: 134832

Type of Feature Contribution: Contributing

Feature: Holua Cabin

Feature Identification Number: 133896

Type of Feature Contribution: Contributing

IDLCS Number: 57562

LCS Structure Name: Holua Cabin

LCS Structure Number: CR-04

Feature: Holua Water Tanks (2)

Feature Identification Number: 133904

Type of Feature Contribution: Contributing

IDLCS Number: 57563

LCS Structure Name: Holua Water Tank

LCS Structure Number: HS-8

Feature: Holua Rear Storage Shed

Feature Identification Number: 134146

Type of Feature Contribution: Non Contributing

Feature: Holua Pit Toilets (3)

Feature Identification Number: 134152

Type of Feature Contribution: Non Contributing

Feature: Holua "Hilton" Corral

Feature Identification Number: 134148

Type of Feature Contribution: Non Contributing

Feature: Holua "Hilton" Shed

Feature Identification Number: 134610

Type of Feature Contribution: Non Contributing

Feature: Holua Horse Hitches (3)

Feature Identification Number: 134606

Type of Feature Contribution: Non Contributing

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Feature: Holua Water Spigot
Feature Identification Number: 134612
Type of Feature Contribution: Non Contributing

Feature: Holua Wilderness Campground
Feature Identification Number: 134614
Type of Feature Contribution: Non Contributing

Feature: Kapalaoa Cabin
Feature Identification Number: 133898
Type of Feature Contribution: Contributing
IDLCS Number: 57564
LCS Structure Name: Kapalaoa Cabin
LCS Structure Number: CR-01

Feature: Kapalaoa Water System (4)
Feature Identification Number: 133910
Type of Feature Contribution: Contributing
IDLCS Number: 57565
LCS Structure Name: Kapalaoa Water System
LCS Structure Number: HS-9

Feature: Kapalaoa Water Tank Platform Structure
Feature Identification Number: 133912
Type of Feature Contribution: Non Contributing

Feature: Kapalaoa Rear Storage Shed
Feature Identification Number: 134156
Type of Feature Contribution: Non Contributing

Feature: Kapalaoa Pit Toilet
Feature Identification Number: 134160
Type of Feature Contribution: Non Contributing

Feature: Kapalaoa Horse Hitches (2)
Feature Identification Number: 134616

Type of Feature Contribution:	Non Contributing
Feature:	Kapalaoa Wood Plank Retaining Wall
Feature Identification Number:	134618
Type of Feature Contribution:	Non Contributing
Feature:	Paliku Patrol Cabin
Feature Identification Number:	133902
Type of Feature Contribution:	Contributing
IDLCS Number:	57558
LCS Structure Name:	Paliku Patrol Cabin
LCS Structure Number:	CR-03
Feature:	Paliku Cabin
Feature Identification Number:	133900
Type of Feature Contribution:	Contributing
IDLCS Number:	57559
LCS Structure Name:	Paliku Cabin
LCS Structure Number:	CR-02
Feature:	Paliku Footbridge
Feature Identification Number:	133944
Type of Feature Contribution:	Contributing
IDLCS Number:	57561
LCS Structure Name:	Paliku Foot Bridge
LCS Structure Number:	HS-7
Feature:	Paliku Water Tanks (2)
Feature Identification Number:	133906
Type of Feature Contribution:	Contributing
Feature:	Paliku Stable
Feature Identification Number:	134162
Type of Feature Contribution:	Non Contributing

Civilian Conservation Corps Haleakala Crater Trails District
Haleakala National Park

Feature: Paliku Water Tank
Feature Identification Number: 134164
Type of Feature Contribution: Non Contributing

Feature: Paliku Metal Shed
Feature Identification Number: 134166
Type of Feature Contribution: Non Contributing

Feature: Paliku Pit Toilets (2)
Feature Identification Number: 134168
Type of Feature Contribution: Non Contributing

Feature: Paliku Water Spigot
Feature Identification Number: 134624
Type of Feature Contribution: Non Contributing

Feature: Paliku Patrol Cabin Corral
Feature Identification Number: 134622
Type of Feature Contribution: Non Contributing

Feature: Paliku Horse Hitches (2)
Feature Identification Number: 134620
Type of Feature Contribution: Non Contributing

Feature: Paliku Wilderness Campground
Feature Identification Number: 134626
Type of Feature Contribution: Non Contributing

Feature: Check Steps (1193)
Feature Identification Number: 134056
Type of Feature Contribution: Non Contributing

Feature: Retaining Walls (3)
Feature Identification Number: 134060
Type of Feature Contribution: Non Contributing

Feature: Check Dams or Water Bars (179)

Feature Identification Number: 134062

Type of Feature Contribution: Non Contributing

Feature: Edging (32)

Feature Identification Number: 134174

Type of Feature Contribution: Non Contributing

Feature: Rip Rap Trail Tread

Feature Identification Number: 134172

Type of Feature Contribution: Non Contributing

Feature: Halemau'u Steel Culverts (3)

Feature Identification Number: 134644

Type of Feature Contribution: Non Contributing

Feature: Halemau'u Open Culverts (11)

Feature Identification Number: 134640

Type of Feature Contribution: Non Contributing

Feature: Halemau'u Gutters (4)

Feature Identification Number: 134642

Type of Feature Contribution: Non Contributing

Feature: Halemau'u Horse Hitch

Feature Identification Number: 134646

Type of Feature Contribution: Non Contributing

Feature: Halemau'u Gate

Feature Identification Number: 134648

Type of Feature Contribution: Non Contributing

Feature: Sliding Sands Horse Hitch

Feature Identification Number: 134650

Type of Feature Contribution: Non Contributing

Landscape Characteristic Graphics:



Buildings and Structures #1: Holua Cabin and water tank, located in the northwest portion of Haleakala Crater at the foot of the towering, 3,000-foot Leleiwi Pali (PWRO, 2008).



Buildings and Structures #2: Paliku Cabin, located in the lushly vegetated eastern extent of Haleakala Crater (PWRO, 2008).



Buildings and Structures #3: The Paliku Patrol Cabin, located a short distance northeast of the Paliku Cabin in Haleakala Crater. Note the two water tanks situated on the slope behind the cabin (PWRO, 2008).



Buildings and Structures #4: Kapalaoa Cabin, located in the south central portion of Haleakala Crater (PWRO, 2008).



Buildings and Structures #5: Kapalaoa water tanks, located on a slope a short distance west of the Kapalaoa Cabin. In 2006, the middle tank was rehabilitated, while the two remaining tanks were replaced in-kind (PWRO, 2008).



Buildings and Structures #6: The Paliku Footbridge was constructed by the CCC in 1937 to provide pedestrian access to the Paliku Patrol Cabin from Paliku Cabin (PWRO, 2008).



Buildings and Structures #7: Stone retaining wall associated with the Halemau'u switchbacks. Note the rustic character of the wall as it seamlessly blends with its surrounding environment (PWRO, 2008).



Buildings and Structures #8: Lichen-covered stone causeway located along the Kaupo Trail (PWRO, 2008).

Circulation

Circulation is defined as spaces and features which constitute systems of movement within a landscape.

Serving as the principal feature of the CCC Haleakala Crater Trails District, the circulation system is defined by a series of trails designed by park planners and constructed or improved by the Civilian Conservation Corps (CCC) between 1930 and 1941. During the period of significance, over 30 miles of trails were developed by the CCC in Haleakala Crater, including the Sliding Sands, Kaupo and Halemau'u Trails, among many others. Following rustic design principles, the trails were designed to highlight crater views and associated volcanic features, while effortlessly blending with the natural environment. The depth of consideration put into the trail's design is evident in the trail's width, gradient, alignment and use of native stone materials.

The crater's primary trails, Sliding Sands and Halemau'u, generally extend in an east/west orientation, descending several thousand feet from the rim to the crater floor. Halemau'u Trail commences in the northwest corner of the park, first heading in a southerly direction and then east approximately 10.3 miles through native shrubland and cinder desert to the Paliku Developed Area. Sliding Sands Trail begins near the Haleakala Visitor Center, which is located in the southwest corner of the park, and continues east along the crater's south side. From the Sliding Sands trailhead, the trail extends through cinder desert and shrublands, terminating at the

junction of Halemau'u Trail on the western side of the crater. Kaupo Trail, also serves as an important component of the trail system. Located on the eastern side of the crater, the 7.1-mile trail (of which 3.7 miles of the trail are located within the boundaries of the park) traverses the steep, rocky terrain in Kaupo Gap in a north/south orientation. In addition, several smaller loop and spur trails are located in the crater. These trails lead to various geologic features and serve to connect the main trail system in central portions of the crater.

A chart listing all of the features associated with each trail is located in the Supplemental Information section at the end of the report. Furthermore, it should be noted that those features (causeways, check steps, check dams, edging and retaining walls) listed as undetermined in the chart were determined to be contributing features within the proposed district. These features were determined to be contributing because it was difficult to distinguish the age of these features due to the use of compatible building materials and workmanship in their construction.

Historical Development

See the Physical History section for complete history of trail development in Haleakala Crater.

The existing trails within Haleakala crater have been used by many different people over the course of centuries. Native Hawaiians were the first group to utilize trails within the crater. The Kihapiilani Highway, or the King's Highway, was probably the most established trail. This was a thoroughfare paved with smooth rock that led from the summit area, through the crater and Kaupo Gap, to East Maui (Tomornari-Tuggle, 2007, 84-86; Bartholomew, 1994, 138). Later, in the 1920s and 1930s, settlers to the island utilized trails within the crater to support cattle grazing efforts. During this period, ranchers used Sliding Sands Trail to drive cattle through the crater to get the cattle to market in exchange for the ranchers' land being incorporated into the National Park (Crenshaw, 1972). In addition to cattle grazing, tourists also utilized the trails during the early historic period to explore the crater.

Early explorers of Maui, including Alexander, Emory, and Newton, mapped the trails within Haleakala Crater. The Halemau'u Trail (also spelled as Hele-mau, Halemauu, and Halemau) was mapped as early as 1881. The Kaupo Trail (previously called the Holoholo-ku) was located within the Kaupo Gap and shows up on early maps of the crater. The Sliding Sands Trail (also called the Keonehe'ehe'e, Keone-heihei, or Racing Sands Trail) is marked on early maps of the crater. The Lau'ulu Trail, which extends from Paliku to Kalapawili Ridge is also marked on early maps (Tomornari-Tuggle, 2007 93).

From 1922 to 1933, only basic maintenance and repair work was performed on the crater trail system. The first major trail work conducted in Haleakala occurred in 1930 after the Halemau'u Trail and other crater trails became in such disrepair that visitors could no longer use them (Allen, "Superintendent's Monthly Report," March 7, 1930; Jackson, 1971, 17). The first major repair work was completed on the Halemau'u Trail in April 1930 with the help of laborers on the island, including Portuguese, Filipino, Hawaiian, and Japanese men. Over the

course of the next several years, work crews reconstructed many trails, including Sliding Sands Trail and Halemau'u Trail, in order to bring them to contemporary NPS standards for grade and width. Additionally, the crews built new trails that connected to newly developed cabin areas within the crater and further outside of the crater in other sections of the park. Throughout the 1930s and into the early 1940s crews continued to maintain the crater trail system, working to stabilize and repair the trails after damage caused by storms.

Alignment

Following design tenets established by naturalistic landscape architecture, many of the trails in the crater exhibit curvilinear alignments and a low grade. Trail planners aligned the trails to follow the natural contours of the topography to promote a leisurely and scenic hiking experience. In order to promote ease of trail use, a relatively low trail grade was maintained, which was not to exceed 15 percent. While sections of the trail located in the central crater are characterized by a straight alignment, the overall character of the trail design is curvilinear, especially in areas with rugged topography. In those areas with direct alignments, it is likely the intended purpose of the trail was to provide a route to developed areas where water and lodging facilities would provide a refuge for weary hikers.

Materials

Materials used by park staff and the CCC during the construction and improvement of the crater trail system also reflect naturalistic and rustic design principles. Native lava stone was used as the primary building material in retaining walls and associated trail features, while trail tread was composed of volcanic stone, pumice, cinders and soil, all of which were utilized in locations where these materials occur naturally. Ultimately, the use of local materials in trail construction allowed the trail and its associated features to harmonize with the surrounding environment providing an experience uninhibited by modern development.

Trail Width

The Haleakala Crater trail system was largely constructed and/or improved according to naturalistic landscape design standards. According to trail construction guidelines published by the NPS in the 1930s, four feet was a standard width for trails intended for humans and horses. Prior to CCC repair and realignment, the width of Halemau'u Trail measured 30 inches, which was later widened to a standard width of four feet. While the historic width of Sliding Sands remains unknown; park staff reported that its width along the upper 3.8 miles near the crater rim was significantly narrower than what is extant today. Despite trail widening along portions of Sliding Sands, the vast majority of the crater trails range between two to four feet wide; however, width is variable as the trail responds to vegetation, topography and natural features such as lava flows or cinder fields.

Trail Changes

Haleakala Crater is a dynamic landscape defined by its rich volcanic history and subsequent erosion, which continues to shape the crater. Every year trail tread is affected by erosion and rock slides, amongst many other natural events. As a result of its dynamic nature, Haleakala's Crater trail system has been subjected to regular repair. Records indicate that numerous annual trail repair projects were undertaken in response to damage incurred by winter storms over the course of the past 75 years. In many places, small sections of trails were washed out and new drainage systems were installed in an effort to stabilize the trail tread. A great majority of these repairs are consistent with the Secretary of the Interior's Standards. Routine maintenance is typically in response to erosion and is limited to repairing damage in order to keep the trail system functional to encourage pedestrian access into the crater.

Contributing Trails

Sliding Sands Trail (Keonehe'ehe'e) (Contributing) (LCS 57568, HS-11)

The Sliding Sands trailhead is located near the Haleakala Visitor Center at the edge of the crater in the southwestern corner of Haleakala National Park. The trail begins at an elevation of 9,778 feet, descending approximately 2,500 feet in 3.8 miles from the southwest rim to the valley floor. The upper reaches of the trail are defined by a series of large switchbacks constructed at a nine percent grade. Characterized by a cinder and sand trail tread and wide alignment, few historic features are located along this segment of the trail. Built trail features are largely contemporary in nature and include wood check steps, wood water bars and a few stone check steps and stone water bars. The cinder and sand trail surface creates hiking conditions similar to walking on a beach. The relative absence of built features and sandy tread give the trail a character of openness and ease of travel. In many areas, the hiker has the freedom to enjoy the surrounding landscape while walking, rather than having to carefully watch their footing on the trail itself.

Upon reaching the crater floor, the character of Sliding Sands trail changes. The trail alignment is relatively straight, or direct, as it traverses through a varied landscape veering towards Kapalaoa Developed Area. In places the trail navigates through stands of bright green ferns, before entering a desolate cinder field. The trail slices through the otherwise largely undisturbed field with ease, although, it is likely that the trail alignment has shifted throughout the years as wind storms have the potential to disturb the trail alignment.

At Kapalaoa Cabin, Sliding Sands trail begins its curvilinear approach to the eastern reaches of the crater. Responding to varied natural topography, the trail winds through aa flows, up and down and around lava flows. The angled surface of an aa flow makes hiking moderately difficult and slow. Exhibiting a greater number of built features than the upper reaches of the trail near the rim, few of these are historic. They are largely composed of wood and stone check steps with a few water bars interspersed throughout. In areas, the density of the vegetation increases as scrub and grasses become visible. Another built feature, which was

commonly seen in areas with heavy aa, are causeways or fill throughs where laborers applied a rock base, which allowed visitors to travel over the flow on a flat trail surface. Similar building practices were also used in low lying areas that had the potential to be wet. Upon reaching the junction with Halemau'u Trail, the Sliding Sands Trail becomes part of larger trail system, which provides visitor access Paliku Developed Areas as well as to the northern reaches of the crater.

Today, impacts associated with commercial horseback riding tours have changed the character of Sliding Sands Trail. Due to the relatively high volume of use, horse tours are attributing to trail widening and erosion problems on the upper 3.8 miles of the trail. While this activity has occurred since the period of significance, the increased use of horses along the trails has modified the historic character of the trail; however, the cumulative impact is not great enough to diminish the integrity of the whole trail because the trail maintains its materials and overall design.

In addition to the impacts mentioned above, the vertical alignment of the upper 3.8 miles of Sliding Sands has been modified as a result of gravitational forces. Through time and as a result of the sandy trail tread, the vertical alignment of the trail has slumped on average ten feet. In places, the old alignment, defined by edging or other human made features, is visible on the uphill slope of the trail. While the vertical alignment of the trail is an important aspect of the integrity of the trail, this natural development is a result of the dynamic landscape. Furthermore, it has not changed the setting, feeling or association of the trail.

Halemau'u Trail (Contributing) (LCS 57569, HS-12)

The Halemau'u Trail commences in the northwest corner of Haleakala National Park, just off the fifth switchback of Haleakala Highway. The trail begins at an elevation of 7,990 feet, descending approximately 1,500 feet in 2.8 miles from the crater rim to Koolau Gap and the associated valley floor. Numerous historic features are located along the upper reaches of the trail, which includes a concentration of heavily engineered features such as switchbacks and retaining walls. The retaining walls were constructed using lava stone and exhibit variable lengths and heights are often obscured by dense vegetation. Several of the walls are constructed at a 45 degree angle, which adds extra support, making the walls extremely stable.

The most striking feature along this portion of the trail is Rainbow Bridge, located near the summit of the trail. Following a narrow ridgeline, Rainbow Bridge is a spectacular natural feature that was improved by the efforts of the CCC. The bridge provides awe inspiring views looking east into the crater, while also providing a glimpse of the lush, heavily vegetated environment outside of the crater. The natural feature extends approximately 20 feet and is supported by retaining walls, which are located along both sides of the bridge.

Beyond retaining walls, built trail features along the upper 2.7 miles of the trail are largely contemporary in nature and include an abundance of rip rap trail tread as well as stone check

steps and stone water bars, amongst many other features. The rip rap trail tread covers a significant portion of the upper 2.7 miles of the trail. While it is a non-contributing feature that was installed after the period of significance, it does not significantly detract from the historic character of the trail because this feature is made of native materials and blends into the surrounding environment. Furthermore, this design addition is reversible.

Upon reaching the crater floor, the character of Halemāu'u Trail changes and it heads in a southerly direction. The trail alignment becomes relatively direct, but still has curvilinear qualities as it traverses through native shrubland toward Holua Developed Area, nestled at the base of Leleiwi Pali. In places the trail navigates through aa flows, responding to the topography with modern trail features such as wood and stone check steps and water bars. Extending beyond Holua, the trail traverses cinder desert in a southeasterly direction toward the central crater. The trail skirts the northern edges of the cinder cones Halali'i, Pu'u Naue and Pu'u Nole before heading east. As a result of the relative lack of obstructions in the area, Halemāu'u's routing is direct, the grade is typically consistent and the tread is easy to navigate.

As the Halemāu'u approaches the eastern side of the crater, the trail is flanked by some of the most recent lava flows, which are only a few hundred years old. This section of the trail is rugged and has undergone numerous washouts throughout the years and as a result many wood and stone check steps and dams have been installed in an effort to stabilize the tread. As the Sliding Sands and Halemāu'u Trails merge near the cinder cone 'O'ilipu'u, the vegetation begins to change and become denser and the trail narrows, thus setting the stage for the approach to the lush Paliku Developed Area.

Kaupo Trail (Contributing) (LCS TBD)

Kaupo Trail is located on the east side of the crater near Paliku Developed Area. Originating at an elevation of 6,300 feet, the trail descends approximately 2,300 feet in 3.7 miles to the park boundary. Documentation of the Kaupo Trail ended at the park boundary around the 4,000-foot elevation mark.

Within the park boundary, the trail traverses in a north/south orientation through Kaupo Gap's steep, rocky terrain. Located on a south facing mountain slope, Kaupo Trail can be very arduous. In areas defined by moderate topography, the trail follows a smooth curvilinear alignment as it descends through lush meadows, native shrubland and mesic koa forest. In the meadows, tall grasses have largely consumed portions of the trail, offering only a narrow and often hard to detect path for visitors to follow. As trail descends the gap, visitors are rewarded with beautiful scenery and distant views of the Pacific Ocean.

Evidence of rock and soil cuts, stone retaining walls and causeways are found along Kaupo as the path responds to the steep topography. The forms of the retaining walls vary in response to the natural surroundings, often curving to follow the alignment of the trail. Evenly distributed along the course of the trail, these features exhibit a large range of lengths and heights. As a

result of the relatively wet environment, many causeways are also located along the trail to provide an elevated surface over rough or wet terrain. In addition, a lichen identified as *Stereocaulon* sp. is especially prominent on stacked stone walls along Kaupo Trail.

Horse Hitch Trail (Ka Moa o Pele) (Contributing) (LCS TBD)

Constructed and/or improved by the CCC during the period of significance, this spur trail is located in the central crater and extends from Sliding Sands Trail near the current horse hitch around the east side of Halali'i to the Bottomless Pit, a distance of 1.7 miles, to join the Halemau'u Trail. The scenic route traverses past the red cinder cone Ka Moa o Pele and Pele's Pig Pen (Pa Puua o Pele), located in the low pass between Halalii and Ka Moa o Pele (Hawaii Nature Notes. The Publication of the Naturalist Division, Hawaii National Park and the Hawaii Natural History Association, June 1959). Characterized by a loose cinder tread and a variable width, the trail lays lightly on the land. Possessing no substantial built infrastructure, the trail only has a few tread cuts to mark its alignment.

Halali'i Cinder Cone Trail (Contributing) (LCS TBD)

This short section of trail is located on the west side of Halali'i and measures approximately three tenths of a mile long. Historically, this short section of trail simply provided visitors with the opportunity to walk on the west Halali'i to experience Pele's Paintpot and the beautiful spectrum of colors reflecting the variety of minerals present in the locale. On the south side of Halali'i, the trail merged with the Horse Hitch Trail where visitors could walk around the east side of the cinder cone to meet the Halemau'u Trail.

Today, the short contributing trail segment continues to provide visitors with views of the west side of Halali'i. In addition, it also serves as a link between the Halemau'u Trail and the non-contributing Short Cut Trail, Pa Puua O Pele, which originates near the Sliding Sands trail, just west of Kapalaoa Cabin. Characterized by a loose cinder tread and a variable width, the trail possesses no substantial built infrastructure beyond its alignment. See below for more information regarding the Short Cut Trail.

Central Crater "Y" Trail (Bubble Cave Trail) (Contributing) (LCS TBD)

Located in the central crater, the existing "Y" shaped trail system provides a vital north/south link between Halemau'u and Sliding Sands Trails. Characterized by a loose cinder tread and a variable width, the trail lies lightly on the land and possesses no substantial built infrastructure. Several stacked stone rock cairns are located along the right side of the "Y" marking the trail alignment, although park staff indicated that these features predate the CCC era.

Historically, the trail system was characterized by an "X" shape, however, by the late 1950s; the southwestern leg of the "X" had disappeared from trail maps. Developed by the CCC, the trails connected the two primary trails. In addition, the trail also provided an access route to

Bubble Cave. In 1959, Bubble Cave was described as "...a large, collapsed bubble with heavy walls. It was blown by gases in ancient molten lava. Only a small segment collapsed in the center of the roof, which serves as an entrance and smoke hole; old-timers were wont to camp in this natural shelter. It was the rest stop now supplanted by Kapalaoa Cabin" (Hawaii Nature Notes. The Publication of the Naturalist Division, Hawaii National Park and the Hawaii Natural History Association, June 1959).

Paliku Access Trail (Contributing) (LCS TBD)

Measuring one quarter of a mile, the Paliku Access Trail is characterized by a curvilinear alignment, narrow width and soil/grass trail tread. Today, the trail gradually ends near the Paliku Campground, giving way to an informal trail demarcated by a grass mown path. This informal path provides visitor access from the terminus of Paliku Access Trail to Paliku Cabin and Paliku Patrol Cabin.

Historically, the Paliku Access Trail, which extends from Halemau'u to Paliku, served two purposes. The trail provided access to the Paliku Developed Area and also provided access to the 2.3 mile Lau'ulu Trail that traversed from Paliku Cabin to Kalapawili Ridge. In 1959 it was reported that, "Lau'ulu Trail is plainly visible as it zigzags up the north wall. Although not maintained at present, it is passable and allows rugged enthusiasts to climb the rim for views of the crater" (Hawaii Nature Notes. The Publication of the Naturalist Division, Hawaii National Park and the Hawaii Natural History Association, June 1959). Today, the Lau'ulu Trail remains in poor condition and is no longer maintained by the park. Lau'ulu Trail was not evaluated as part of this study because the CLI focused exclusively on the main trail system within the crater.

Non-Contributing Trails

Holua Developed Area Campground Access Trail (Non-Contributing)

The Holua Developed Area includes one short access trail. Constructed to provide access to a secondary developed area, the trail traverses up a short, but relatively steep incline to a wilderness campground as well as the "Hilton" shed and horse corral. The trail originates south of Holua Cabin and is characterized by large, stone check steps that are the result of 1980s trail repair work. Because this development occurred after the period of significance, the trail does not contribute to the proposed district.

Social Trails (Non-Contributing)

Social trails are located throughout the CCC Haleakala Crater Trails District; however, they are more concentrated in areas where visitation is higher. Not surprisingly, the top 3.8 miles of Sliding Sands Trail near the crater rim and the top 2.7 miles of the Halemau'u Trail have experienced the greatest influx of social trails. Most often these trails are shortcuts back to the

main trail, although social trails have also formed in locations where visitors can take breaks and photograph interesting subject matter. Social trails occur with less frequency in the central crater; however, several are present near features such as Pele's Pig Pen and the Bottomless Pit.

Short Cut Trail (Pa Puaa O Pele) (Non-Contributing)

The non-contributing Short Cut Trail, Pa Puaa O Pele, extends from Sliding Sands to Halali'i Cinder Cone Trail, a distance of approximately 1.1 miles. Present on maps as early as 1959, the trail traverses in a northwesterly direction connecting with the contributing Halali'i Cinder Cone Trail, which provides access to Halemau'u Trail. Likely developed by the NPS after the period of significance as a short cut trail across the central crater from Kapalaoa to Holua, the trail does not contribute to the proposed district.

Crater Trail System Signs (Non-Contributing)

There are no historic signs located within the boundaries of the proposed historic district. Although several signs and information boards are located along trails and in developed areas, they were installed after the period of significance and do not contribute to the character of the district.

Character-defining Features:

Feature: Sliding Sands Trail (Keonehe'ehe'e)

Feature Identification Number: 133952

Type of Feature Contribution: Contributing

IDLCS Number: 57568

LCS Structure Name: Sliding Sands Trail

LCS Structure Number: HS-11

Feature: Halemau'u Trail

Feature Identification Number: 133954

Type of Feature Contribution: Contributing

IDLCS Number: 57569

LCS Structure Name: Halemau'u Trail

LCS Structure Number: HS-12

Feature: Kaupo Trail

Feature Identification Number: 133956

Type of Feature Contribution: Contributing

Feature: Horse Hitch Trail (Ka Moa O Pele)

Feature Identification Number: 133958

Type of Feature Contribution: Contributing

Feature: Halali'i Cinder Cone Trail

Feature Identification Number: 133960

Type of Feature Contribution: Contributing

Feature: Central Crater "Y" Trail (Bubble Cave)

Feature Identification Number: 133962

Type of Feature Contribution: Contributing

Feature: Paliku Access Trail

Feature Identification Number: 133964

Type of Feature Contribution: Contributing

Feature: Social Trails

Feature Identification Number: 134188

Type of Feature Contribution: Non Contributing

Feature: Short Cut Trail (Pa Puaa O Pele)

Feature Identification Number: 134190

Type of Feature Contribution: Non Contributing

Feature: Holua Developed Area Campground Trail

Feature Identification Number: 134656

Type of Feature Contribution: Non Contributing

Feature: Crater Trail System Signs

Feature Identification Number: 134900

Type of Feature Contribution: Non Contributing

Landscape Characteristic Graphics:



Circulation #1: View of Sliding Sands Trail looking toward the crater rim (PWRO, 2008).



Circulation #2: View of Sliding Sands Trail as it traverses an aa flow east of Kapalaoa Cabin (PWRO, 2008).



Circulation #3: View of Sliding Sands Trail as it extends east through vegetation in the central crater (PWRO, 2008).



Circulation #4: Switchbacks and associated stone retaining walls along the Halemau'u Trail as it ascends out of the crater. Notice how the trail follows the topography, while blending with the natural environment (PWRO, 2008).



Circulation #5: Character of Halemau'u Trail as it traverses across the eastern crater behind 'O'ilipu'u. In this area, the trail incorporates areas of smooth lava known as pahoehoe into its alignment.



Circulation #6: Lichen-covered rip rap retaining wall along Kaupo Trail (PWRO, 2008).



Circulation #7: Looking north, Kaupo Trail traverses lush vegetation as it ascends Kaupo Gap (PWRO, 2008).

Topography

Topography is defined as the landforms which have been manipulated by human activity. (For a description of natural topography and geology, see the Natural Systems and Features section.)

In response to the varied nature of the topography associated with Haleakala Crater, the manipulation of the landscape by park staff and the CCC required concentrated efforts along three trails—Halemau'u, Sliding Sands and Kaupo. The construction and/or improvement of these trails necessitated that each trail descend thousands of feet in elevation at a reasonable grade to reach their respective destination. In many cases, the use of tread cuts and fill sections was required to negotiate the rough, steep terrain characteristic of locations near the rim and in Kaupo Gap. Today, switchbacks and stone retaining walls remain prominent features along portions of the trails. As a reflection of rustic design, great effort was taken to minimize the disturbance of the surrounding landscape. During trail construction, local materials were used to build retaining walls and switchbacks, ensuring that the trail would blend with the environment. Furthermore, the trail alignment hugged the natural contours and tread cuts were fashioned with sensitivity to the naturalistic design intent.

Grade

Many of the trails located within Haleakala Crater were designed and/or improved with grades of less than 15 percent, which was considered a moderate grade compared to the original grades that were often over 30 percent. Early plans indicate that the current Halemau'u Trail was constructed at a maximum 15 percent grade on straight segments and 10 percent on switchbacks, while the old Halemau'u Trail, which washed out in the late 1920s, originally had a

30 percent grade. Today, the Sliding Sands Trail is characterized by a 9 percent grade. While the grade of Sliding Sands is under the acceptable limits, many hikers find it difficult to ascend out of the crater on sandy trail to an elevation of nearly 10,000 feet. In contrast, as a result of the largely flat topography associated with central portions of the crater, trail grade responds to natural features, but is generally minimal.

Tread Cuts

Tread cuts, also known as rock cuts, are found in association with the development and construction of trails throughout the proposed district. Tread cuts are sculpted rock faces of varying heights created through construction activities through steep, rocky terrain, typically involving a near-vertical cut on the interior, uphill side of the trail. In keeping with the principles of naturalistic landscape architecture, NPS landscape architects specified several measures to be undertaken in order to ensure that the artificial rock cuts blended seamlessly with their natural environment. Rock cuts were not made perfectly vertical, but were battered at an angle, or blasted to leave overhanging ledges, to simulate a natural rock outcropping. Masons were directed to work the faces of the cuts in order to hide the drill scars that remained after the initial blasting and cutting process. The top edges of the rock cuts were typically tapered into the natural slope and re-vegetated in order to further enhance the naturalistic properties of the cuts (Paragraph adapted from the Haleakala Highway CLI, 82).

Cuts are frequently encountered along the upper reaches of the Halemau'u Trail as the path ascends out of the crater along the rocky alignment to the summit at 7,990 feet. Historical sources indicate that the trail alignment was initially developed by the CCC with the aid of dynamite and hand drills. Evidence of minor rock and soil cuts are also found along Kaupo Trail as the path traverses steep topography descending from 6,300 feet to approximately 4,000 feet at the park boundary. A total of 51 contributing tread cuts were documented in the field, although, it is likely that more exist. Based on field observations, many of the original cuts along upper portions of the Halemau'u Trail and Kaupo Trail remain from the period of significance because the trail alignment in these areas has not been significantly altered, although, minor changes may have occurred as a result of rock slides and other natural events. Despite these changes, naturalistic tread cuts still characterize segments of the Halemau'u and Kaupo Trails today.

Cuts and Fills

Cuts and fills are commonly found along portions of the crater trails system that traverse moderate to steep topography. A typical trail cross section constructed using cut and fill techniques includes a cut carved into a slope and the subsequent use of the material that was gained to widen the trail. In many cases, the trail builders attempted to equalize the amount of cut with a similar amount of fill material. After the cut and fill was completed, retaining walls were often built to stabilize adjacent slopes. On both the Halemau'u and Kaupo Trails, several retaining walls were built at a 45 degree angle to provide additional stability in the dynamic

landscape, characterized by rockslides and erosion. Constructed using local materials, the retaining walls blend with the surrounding environment as dictated by rustic design principles.

In particular, cuts and fills predominate along the upper 3.8 miles of the Sliding Sands Trail and along approximately 2.2 miles of the Halemau'u Trail as it ascends to the rim. Cuts and fills have also been utilized along the entire extent of Kaupo Trail as it descends thousands of feet in elevation through Kaupo Gap. Despite the heavily engineered trails constructed near the rim and through Kaupo Gap, significantly less manipulation is evident in the construction of Sliding Sands and Halemau'u Trails on the crater floor where cuts and fills are practically non-existent. Today, the cuts and fills, which are directly linked to trail alignment and associated retaining walls date to the period of significance and as a result contribute to the character of the landscape.

Switchbacks

The CCC Haleakala Crater Trails District encompasses numerous switchbacks associated with the upper reaches of Sliding Sands and Halemau'u Trails as well as the entire extent of Kaupo Trail. Like retaining walls and cut and fill slopes, switchbacks are built in rugged locations where ordinary trail construction techniques cannot be utilized. Often characterized by sharp turns proceeding in alternating directions up a steep incline, switchbacks are constructed to gain elevation at a reasonable grade to promote ease of trail use. The construction of switchbacks often, but not always, requires cutting into uphill side and filling the downhill side of the trail surface to create an area large enough for the trail surface as it turns 180 degrees. To provide additional stability, switchbacks are supported by dry laid stone retaining walls constructed using lava stone.

At Haleakala, the switchbacks were constructed using naturalistic design tenets, which included the tight alignment of switchbacks on the Halemau'u Trail in an attempt to try to minimize their visibility from the crater as well as the use of native materials when constructing retaining walls in order to blend with the surrounding landscape. As a result of their association with the historic trail alignments along the Sliding Sands, Halemau'u and Kaupo Trails, switchbacks contribute to the development of the trails system.

Today, the tread cuts, cuts and fills and switchbacks, which serve as character defining features along portions of the Sliding Sands, Kaupo and Halemau'u Trails, retain integrity contributing to the proposed historic district.

Views and Vistas

Views are defined as the expansive or panoramic prospect of a broad range of vision, which may be naturally occurring or deliberately contrived. Vistas are the controlled prospect of a discrete, linear range of vision, which is deliberately contrived.

Views play one of the most critical roles of the visitor experience at Haleakala. To meet visitor expectations, the trails near the rim and throughout the crater were constructed and/or improved to capture optimal views of the volcanic topography with minimal distraction from the

trail itself. Stone retaining walls were constructed using local lava stone to blend with the surrounding environment and switchbacks were aligned tightly to try to minimize visibility from the crater floor. Furthermore, the low-growing character of the largely native vegetation associated with the Alpine (aeolian) zone of the crater ensured that views would not be blocked by their growth.

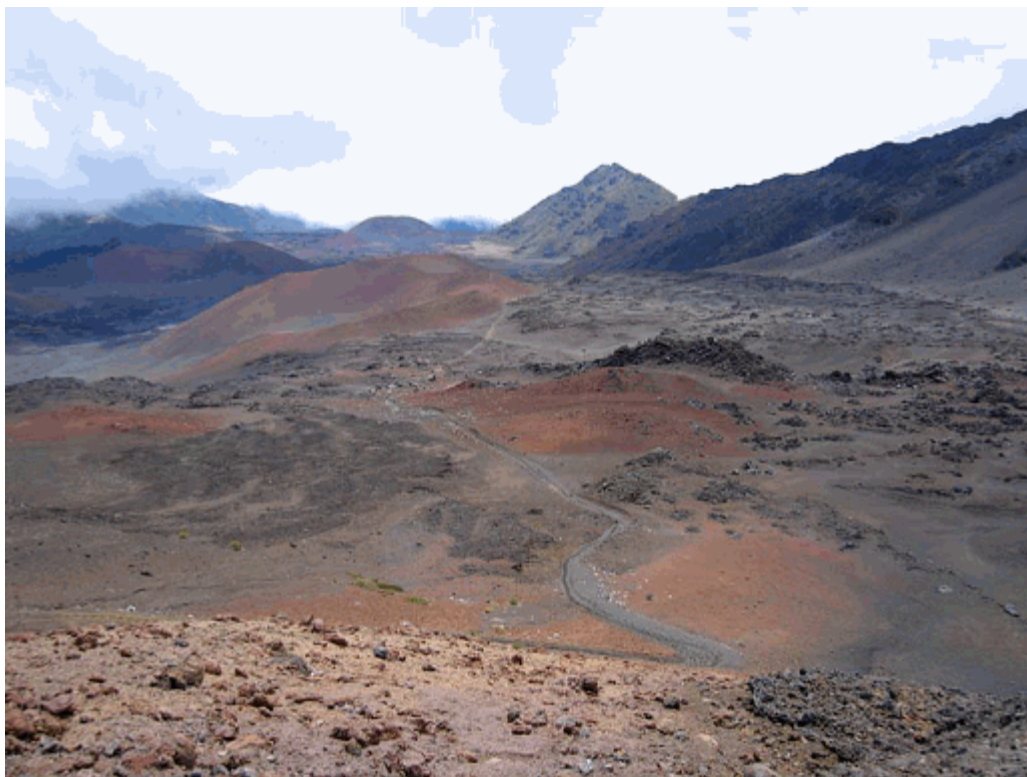
On a clear day, visitors can stand near the summit at Red Hill and gaze into the broad expanse of the crater. Around mid afternoon, if not earlier, clouds envelop the crater, blocking views from the summit. As a result, many visitors hike a short distance down the Halemau'u or Sliding Sands Trails to enjoy panoramic views of cinder cones such as Ka Lu'u o ka 'O'o, Kama'oli'i and Pu'u o Maui, which radiate hues of ochre and orange. While most visitors seldom venture to the crater floor, the upper reaches of Sliding Sands Trail provide spectacular views of the central crater and its associated environment. Uninhibited by treacherous topography and jagged rocks, the alignment of the sand/cinder trail follows a gradual grade with few, if any, obstructions blocking views.

Located in the northwestern corner of the crater, the Halemau'u Trail switchbacks also provide magnificent, sweeping views of the crater. Traversing rugged topography, the heavily engineered trail is characterized by the presence of rustic stone retaining walls and switchbacks as it winds around steep rock faces providing a range of vantages both within and outside the crater. Significantly, Rainbow Bridge, situated just above the switchbacks provides the most dramatic view of the seemingly barren volcanic crater and the lush, green adjacent landscape, which are in sharp contrast to one another.

Kaupo Trail provides a different kind of view and experience than Sliding Sands and Halemau'u Trails, which are oriented toward the volcanic interior of the crater. Located on the extreme eastern extent of the crater, Kaupo Trail provides distant views of the Pacific Ocean and is characterized by lush, tropical vegetation. Traversing in a north/south direction down Kaupo Gap, the trail was likely sited in this location for practical purposes, rather than for aesthetic reasons. Historically, Kaupo Trail was used as a cattle trail and later the CCC improved the trail, adding features such as rustic stone retaining walls and causeways to provide visitor access. Today, the trail experience remains largely the same; however, the growth of vegetation may block select views.

Today, many of the views that inspired the design and subsequent development of the CCC Haleakala Crater trails system still remain. Playing an important role in the visitor experience, views and vistas contribute as a landscape characteristic to the proposed historic district.

Landscape Characteristic Graphics:



Views and Vistas #1: View of Haleakala crater from the Sliding Sands Trail (PWRO, 2008).



Views and Vistas #2: View of Halekala Crater from the Halemau'u Trail. In this photo, the trail crosses Rainbow Bridge, a spectacular natural feature that was improved by the CCC during the period of significance (PWRO, 2008).

Condition

Condition Assessment and Impacts

Condition Assessment: Fair

Assessment Date: 07/25/2008

Condition Assessment Explanatory Narrative:

Through the analysis and evaluation of landscape characteristics and features, it has been determined that the proposed CCC Haleakala Crater Trails District is in "fair" condition. The landscape shows clear evidence of minor disturbances and deterioration by natural and/or human forces, and some degree of corrective action is needed within 3-5 years to prevent further harm to its cultural and/or natural values. If left to continue without the appropriate corrective action, the cumulative effect of the deterioration of many of the landscape characteristics will cause the inventory unit to degrade to poor condition.

Stabilization Measures:

Historic trail features dating from the period of significance should be stabilized, preserved where possible, and maintained until a cultural landscape treatment report or trail management plan is completed that would provide a coordinated treatment response to the trail system as a whole.

The following stabilization measures have been identified for the CCC Haleakala Crater Trails District:

1. Stabilize slope along the upper 3.8 miles of Sliding Sands Trail to stop the formation of large gulleys along the trail.
2. Stabilize stone retaining walls that have been damaged by rock slides and erosion along the upper 2.7 miles of the Halemau'u Trail.
3. Revegetate areas where social trails have denuded vegetation adjacent to the trail. In particular, social trails along the upper 2.7 miles of the Halemau'u Trail should be revegetated to prevent erosion.
4. Manage tall grasses that overwhelm portions of the Kaupo Trail in order to maintain historic alignment.
5. Stabilize stone clad foundations associated with the cabins located in the crater to curb continued deterioration.

Impacts

Type of Impact: Vegetation/Invasive Plants

External or Internal: Internal

Impact Description: In several locations, vegetation is encroaching upon the trail system, negatively impacting built features. On the east side of the crater, the lush grasses and vegetation associated with the Kaupo Gap are obscuring portions of the alignment of Kaupo Trail and its associated features, making it difficult for hikers to find their way. On the western reaches of Haleakala Crater, vegetation is also encroaching on retaining walls along and the upper reaches of the Halemau'u Trail making it difficult to distinguish between the walls and adjacent slope.

Type of Impact: Vandalism/Theft/Arson

External or Internal: Internal

Impact Description: Since their construction in 1937, the Haleakala Crater cabins have been the subject of repeated acts of vandalism. In the past, windows were broke in order to gain entry into the cabins. To deter vandalism the park installed steel bars over the inside of all window openings. Today, the cabins have been secured to prohibit illegal entry. As a result, incidences of vandalism have lessened to carving initials into the wooden tables and the occasional breaking of windows.

Type of Impact: Erosion

External or Internal: Internal

Impact Description: Haleakala Crater is a dynamic landscape defined by its rich volcanic history and subsequent erosion, which continues to shape the crater. Composed of highly erodible soils, the trail system is negatively impacted by water erosion, which occurs as a result of heavy seasonal rains. The effects of water erosion are visible as trail tread is lost and portions of historic retaining walls are damaged.

Erosion is exacerbated by contemporary human uses such as travel by horses, which in many locations widens trail alignments and hastens the deterioration of trail features.

Type of Impact: Exposure To Elements

External or Internal: Internal

Impact Description: Exposure to elements has resulted in negative impacts to historic buildings and trails located in Haleakala Crater. The stone facing on the foundation of Paliku Cabin is deteriorating as a result of excess moisture from runoff. Similiar problems are also evident

at the Paliku Patrol Cabin and Kapalaoa Cabin. In the future, rain runoff should be diverted away from the buildings to prevent damage. Historic trails are also being impacted by seasonal storms, which are causing erosional problems. See "erosion" discussion in the Impacts section for more information.

Type of Impact: Improper Drainage

External or Internal: Internal

Impact Description: Due to insufficient trail drainage, trail tread is being lost, retaining walls are being damaged by rock slides and large gullies are forming on the downhill slope of the trails, causing damage to built trail resources below. Without the installation of a sufficient trail drainage system, the threat of increased erosion may destroy historic trail resources in the future.

Type of Impact: Deferred Maintenance

External or Internal: Internal

Impact Description: As a result of years of deferred maintenance, the overall condition of the proposed CCC Haleakala Crater Trails District is fair. Largely damaged by water erosion, the historic trails need a sufficient drainage system to remove excess water off of the trail surface. Additional work should be performed to stabilize historic retaining walls, causeways, buildings and structures.

Type of Impact: Visitation

External or Internal: Internal

Impact Description: In many places, visitors have developed social trails near the established trail system. The informal development of social trails exacerbates erosion problems and harms adjacent sensitive vegetation. Due to the fragile nature of the ecosystem, hikers must stay on marked trails.

Type of Impact: Inappropriate Maintenance

External or Internal: Internal

Impact Description: Stone materials that have been replaced show tool marks, which are incompatible with the historic stone features that do not show tool marks.

Type of Impact: Inappropriate Maintenance

External or Internal:	Internal
Impact Description:	The replacement or addition of check steps and check dams constructed using milled lumber is incompatible with the existing stone features.
Type of Impact:	Inappropriate Maintenance
External or Internal:	Internal
Impact Description:	The installation of stone rip rap is incompatible with the historic trail tread.

Treatment

Treatment

Approved Treatment: Preservation

Approved Treatment Document: General Management Plan

Document Date: 01/01/1995

Approved Treatment Document Explanatory Narrative:

According to the Haleakala National Park 1995 General Management Plan (GMP), “The CCC facilities in the Crater District will continue to be preserved and used in their original capacity. These resources include the crater cabins and their associated water tanks; the footbridge at Paliku; the Sliding Sands and the Halemau’u Trails” (HALE GMP, 1995, 56).

A cultural landscape treatment report or trail management plan should be prepared in order to address an appropriate maintenance and treatment approach consistent with the Secretary's Standards for features within the historic district. What is left of the historic materials and features, including the original material of the check steps, check dams, and retaining walls, should be preserved until a treatment consistent with the Secretary's Standards can be developed. Further removal and replacement of historic features along the trail system should be halted until a cultural landscape report or trail management plan can be prepared, which would detail appropriate treatment of the area.

Approved Treatment Completed: No

Approved Treatment Costs

Cost Date: 01/01/1995

Bibliography and Supplemental Information

Bibliography

Citation Title: For Bibliography, see "Supplemental Information."

Supplemental Information

Title: Bibliography

Description: Government Documents

Carey & Co. Inc., Draft Amendment. "Haleakala National Park Crater Historic District: Backcountry Historic District." Prepared for the National Park Service. San Francisco: Carey & Company, 2005.

Carey & Co. Inc., Draft Multiple Property Determination. "Draft Determination of Eligibility for Hawai'i National Park: Planning and Development through World War II." Prepared for the National Park Service. San Francisco: Carey & Company, 2005.

Crenshaw, Hugh L. Legislative History. Hawaii National Park, 1972.

General Management Plan, Environmental Impact Statement: Haleakala National Park. National Park Service, 1995.

Good, Albert H., ed. Park and Recreation Structures. Washington D.C.: National Park Service, 1938.

Gordon, E. "Replace/Rehabilitate Crater Water Tanks." Cultural Resources and Park Research Report, Fiscal Year 2006, Haleakala National Park archives.

Haleakala Highway, Haleakala National Park: Cultural Landscape Inventory. Prepared by the Pacific West Regional Office, National Park Service, 2009.

Haleakala National Park memorandum from Elizabeth Gordon, HALE Cultural Resource Program Manager and Archeologist. "Interview with Eddie Grasa (ph#808-572-0133), ex HALE Roads and Trails Foreman" August 8, 2008. National Park Service, Haleakala National Park files.

Hawaii National Park. "Final Construction Report: Job 517, Location Survey and Construction New Halemau-u Trail." Construction Ended February 27, 1936. National Park Service, Haleakala National Park archives.

_____. "Final Report: Halemau to Rest House Trail Extension (Haleakala Section)." Completed September 1931. Haleakala National Park archives.

Jackson, Frances. An Administrative History of Hawaii Volcanoes National Park [&] Haleakala National Park. Honolulu: University of Hawaii, 1972.

Larson, James W., ed. Haleakala: Natural Sciences Research Plan. National Park

Service, 1969.

Law, Henry G. Haleakala National Park, Hawaii : An Architectural Evaluation. San Francisco: National Park Service, 1976.

Leavitt, E.P. "Final Construction Report." May 5, 1931. Haleakala National Park archives.

Master Plan, Haleakala National Park, Mission 66 Edition, Volume I: Master Plan Narrative. National Park Service, Haleakala National Park archives.

Master Plan, Haleakala National Park, Development Outline, November 3, 1952. National Park Service, Haleakala National Park archives.

Medeiros, A.C., L.L. Loope and C.G. Chimera's "Flowering Plants and Gymnosperms of Haleakala National Park" Technical Report #120. Honolulu: Pacific Cooperative Studies Unit, University of Hawaii at Manoa, 1998.

Oberhansley, Francis Ried. "Annual Report to the Governor of the Territory of Hawaii (1949-1953)." July 20, 1950. Haleakala National Park archives.

Sager, Merel S. "Narrative Report to the Chief Architect through the Superintendent of Hawaii National Park." April 22-May 25, 1934. Haleakala National Park archives.

_____. "Radio Talk for Haleakala Road Opening," text attached to "Superintendent's Monthly Report," March 1935. Haleakala National Park archives.

"Superintendent's Monthly Reports," 1922-1967. Haleakala National Park archives.

Tomonari-Tuggle, M. J. and H. David Tuggle. Archeological Overview and Assessment for Haleakala National Park, Island of Maui. Honolulu: International Archaeological Research Institute, Inc., 2007.

Vaughan, Thomas, Russell A. Apple, and E.J. Ladd. National Register of Historic Places Inventory-Nomination Form for Crater Historic District, Haleakala National Park. Honolulu: National Park Service, 1974.

Vint, Thomas C., Chief Landscape Architect. "Report on Trip made by Landscape Architect to Hawaii National Park, Hawaii, February/March 1930." (Haleakala National Park, December 14, 1931), Haleakala National Park archives.

Whitaker, Louis D. "The Vegetation and Environment in the Crater District of Haleakala National Park," Technical Report #35. Cooperative National Park Resources Studies Unit Hawaii, University of Hawaii at Manoa, 1980.

Wingate, Edward H. "Annual Report to the Director- Fiscal Year 1947." Haleakala National Park archives.

_____. "Commanding General, Hawaii Department, USA, Ft. Shafter, Territory of Hawaii, May 15, 1941." Folder "Army use- Haleakala (1941)." Haleakala National Park archives.

_____. "General Statement on Hawaii National Park for Information of Congressional Committee Studying Statehood for the Territory of Hawaii." Articles and Broadcasts by Wingate/Christ (1935-1940). Haleakala National Park archives.

_____. "Memorandum on Annual Forestry Report." January 15, 1942, 2. Haleakala National Park archives.

_____. "Resume of the work of NPS Hawaii National Park, Fiscal Year ending June 30, 1937." Haleakala National Park archives.

Pamphlets

Department of the Interior. National Park Service. Hawaii National Park. US Government Printing Office, 1938. Pacific Great Basin Support Office, National Park Service, Oakland, California.

_____. National Park Service. Rules and Regulations of Hawaii National Park. US Government Printing Office, n.d. Pacific Great Basin Support Office, National Park Service, Oakland, California.

Books

Bartholomew, Gail. Maui Remembers: A Local History. Honolulu: Mutual Publishing, 1994.

Carlquist, Sherwin. Hawaii a Natural History: Geology, Climate, Native Flora and Fauna Above the Shoreline. Lawai: Pacific Tropical Botanical Garden, 1980.

Carr, Ethan. Wilderness by Design: Landscape Architecture and the National Park Service. Lincoln: University of Nebraska Press, 1998.

Kyselka, Will and Ray Lanterman. Maui, How It Came to Be. Honolulu: University of Hawaii Press, 1980.

Mack, Jim. Haleakala: The Story Behind the Scenery. KC Publications, Inc., 1992.

Maui News Haleakala Souvenir Edition, Supplement to Maui News, Issued in Commemoration of the Official Opening of the Scenic Highway to the Summit of Haleakala, the World's Greatest Dormant Volcano. Wailuku: Maui Publishing Co., February 23, 1935.

McClelland, Linda. Building the National Parks. Baltimore: Johns Hopkins University Press, 1998.

Pukui, Mary and Samuel Elbert. Hawaiian Dictionary. Honolulu: University of Hawaii Press, 1986.

Whitney, Henry M., comp and ed. The Tourists' Guide Through the Hawaiian Islands, Descriptive of Their Scenes and Scenery. Honolulu: The Hawaiian Gazette Company, 1890.

Wilkes, Charles. Narrative of the United States Exploring Expedition During the Years 1838, 1839, 1840, 1841, 1842. Vol. 4. New York: G.P. Putnam, 1856.

Periodicals

Barter, Chris. "Jordan Pond Rehabilitation Project." In Preserving Historic Trails: Conference Proceedings, October 17-19, 2000, Acadia National Park, Maine.

Gordon-Cumming, Constance Frederica, "The Largest Extinct Volcano (An Ascent of Haleakala)." Scribner's Monthly 22, no. 2 (June 1881): 272-275.

Griswold, Stephen. "Trailwork Solutions in United States National Parks, Peru, and Nepal." In Preserving Historic Trails: Conference Proceedings, October 17-19, 2000, Acadia National Park, Maine.

Missionary Herald 25, no. 8 (August 1829): 246-251.

Travis, Scott E. "Documentation and Preservation of Historic CCC Trails in Chiricahua National Monument, Arizona." In Preserving Historic Trails: Conference Proceedings, October 17-19, 2000, Acadia National Park, Maine.

Newspaper Articles

Honolulu Advertiser. June 19, 1997 and November 24, 1998.

Maui News. January 14, 1911 to July 9, 1941.

Maps

“Haleakala Headquarters & White Hill Area” [drawing], 1936, “Master Plans—Hawaii National Park” Folder 3 of 5, Record Group 79, National Archives and Records Administration at College Park, Maryland facility (hereafter NARA-College Park).

Master Plans. Complete original drawing sets for 1931, 1932, 1935, 1936, 1937, 1938, and 1939 are located at NARA-College Park. It is unclear if updates were prepared in 1933, 1934, 1940, 1941, or 1942. Additional master planning documents, including six-year plans and development outlines, and correspondence files from the period make no reference to drawings for these years.

“Special Areas & Fire Control Plan” [drawing], 1931, “Master Plans—Hawaii National Park” Folder 3 of 5, Record Group 79, NARA-College Park.

Personal Contacts

Nagata, Ron, Resource Management Chief. Electronic mail correspondence with PWR-Seattle Historical Landscape Architect, Cortney Cain, October, 2008.

Websites

“Hawai’ian Style Cottages 1995.” In State of Hawai’i Department of Land and Natural Resources Historic Sites Calendar 1995 [online], c. 2002 [cited August 29, 2008]. Available at <http://www.Hawai’i.gov/dlnr/hpd/hpcal95.htm>.

Archives

Bishop Museum Archives, Honolulu, Hawaii.

National Archives and Records Administration at College Park, College Park, Maryland.

Park Archives, Haleakala National Park, near Kula, Maui, Hawaii.

Pacific Great Basin Support Office, National Park Service, Oakland, California.

Technical Information Center, Denver Service Center, National Park Service, Denver, Colorado.

Title: Civilian Conservation Corps Haleakala Crater Trails District Features Chart

Civilian Conservation Corps Haleakala Crater Trails District
Haleakala National Park

Description: A chart providing additional detail about individual features is available from the park or the CLI Coordinator at the Pacific West Regional Office.

Title: Civilian Conservation Corps Haleakala Crater Trails District Location Map

Description: A larger version of the location map is available from the park or the CLI Coordinator at the Pacific West Regional Office.

Title: Civilian Conservation Corps Haleakala Crater Trails District Site Plan

Description: A larger version of the site plan is available from the park or the CLI Coordinator at the Pacific West Regional Office.

Title: Civilian Conservation Corps Haleakala Crater Trails District, Holua Cabin Developed Area Site Plan

Description: A larger version of the site plan is available from the park or the CLI Coordinator at the Pacific West Regional Office.

Title: Civilian Conservation Corps Haleakala Crater Trails District, Kapalaoa Cabin Developed Area Site Plan

Description: A larger version of the site plan is available from the park or the CLI Coordinator at the Pacific West Regional Office.

Title: Civilian Conservation Corps Haleakala Crater Trails District, Paliku Cabin Developed Area Site Plan

Description: A larger version of the site plan is available from the park or the CLI Coordinator at the Pacific West Regional Office.

Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h378	Abraded Trail		Abraded trail with erosion		
k74	Abraded Trail		Trail narrows and is abraded, 1 foot wide. Trail alignment changes through dense grassy area. Dense fields of native raspberry on slope		
s103	Abraded Trail		Trail width averages 3-4 feet wide, although in some places it is as wide as 10 feet. Here the trail is widening as it becomes abraded with two walking paths divided by ferns.		
cc1	Alternate Alignment		Alternate route to trail. Triangle shaped intersection with Halemau'u	N	N
h12	Alternate Alignment			N	N
h27	Alternate Alignment		Old trail abandoned, possibly as result of horse/mule reroute	U	U
h32	Alternate Alignment		Junction of old and new trail	N	N
hs17	Alternate Alignment		Junction of old and new trail alignment. Old trail has checksteps at beginning, but they are likely additions. (Southside of trail loop is new)	N	N
hs47	Alternate Alignment		Historic trail no longer used	U	U
hs51	Alternate Alignment		Historic trail parallels new trail	U	U
hs52	Alternate Alignment		Trails rejoin	N	N
s109	Alternate Alignment		Trail narrows to 1-2 feet wide as it traverses aa flow	N	N
s22	Alternate Alignment		New trail alignment	N	N
s28	Alternate Alignment		Alternate alignment extends for 50 feet	N	N
s33	Alternate Alignment		Small section of possible realignment	N	N
s34	Alternate Alignment		Small section of possible realignment	N	N
s35	Alternate Alignment		Small section of possible realignment	N	N

Note: This table lists the GPS feature points on each trail. The ID_ column corresponds to the trail name abbreviation located at the end of this table.

Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
s42	Alternate Alignment		Old alignment with checksteps exposed?	U	U
s43	Alternate Alignment		Old alignment?	U	U
s46	Alternate Alignment		Old trail alignment?	U	U
s52	Alternate Alignment		Small section of possible realignment	N	N
s58	Alternate Alignment		Abraded trail alignment	N	N
h1001	Alternate Alignment		Short realignment (I think this point was duplicated)	N	N
h877	Alternate Alignment		Approximately 20 feet of new trail	N	N
h885	Alternate Alignment		New alignment parallels old alignment for approximately 30 feet. 2 check dams are on the old alignment.	U	U
h888	Alternate Alignment		Possibly two to three different alignments for approximately 10 feet. Old alignment had rip rap trail tread. Current alignment is 2 feet wide and dirt.	N	N
hs48	Alternate Alignment		Trails rejoin	N	N
hda1	Building	Wood and Metal	The Holua Hilton or Shed. Shed with lean to addition and open sidewalls.	N	N
pda10	Building	Wood clad	Paliku Patrol cabin built by CCCC in 1937	Y	
pda2	Building	Wood clad	Paliku Visitor Cabin built by CCC in 1937. Note: other points taken with GPS--some referred to as Paliku and derivations of thereof.	Y	
s108	Building	Wood clad	Kapalaoa Cabin	Y	
hda29	Building	Wood clad	Holua Cabin built by CCC. Grass in front of cabin. Only one berm in front of cabin	Y	
kda7	Building (D)	Wood clad	(Duplicate) Area of Kapalaoa Cabin recorded using GPS.	Y	

Note: This table lists the GPS feature points on each trail. The ID_ column corresponds to the trail name abbreviation located at the end of this table.

Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h356	Causeway	Stone	Causeway, with no stones lining the edge. Many of the previous causeways have had lava stone edging associated with them.	Y	
h359	Causeway	Stone	50-foot long causeway that is stone lined	Y	
h365	Causeway	Stone		Y	
h366	Causeway	Stone	More contemporary looking	U	Y
h371	Causeway	Stone	Causeway is 15 feet long	U	Y
k100	Causeway	Stone	Causeway 60 feet long on both sides of trail	Y	
k104	Causeway	Stone		Y	
k16	Causeway	Stone	Segments of 35-foot long causeway likely underneath vegetation, although it is so dense, it is difficult to see. As a result, some walls or portions of walls along the trail may have been missed.	Y	
k46	Causeway	Stone	Causeway 30 feet long	Y	
k49	Causeway	Stone	Causeway 10 feet tall and 50 feet long and is a good example	Y	
s177	Causeway	Stone	Some lava stones piled along trail to form a causeway	U	Y
s179	Causeway	Stone		U	Y
h34	Causeway	Stone		Y	
h346	Causeway	Stone	Causeway is 40 feet long	U	Y
h350	Causeway	Stone	Causeway is 15 feet long	Y	
h351	Causeway	Stone	Causeway is 12 feet long	Y	
h367	Causeway	Stone	Causeway is 30 feet long	U	Y
h368	Causeway	Stone	Causeway is 20 feet long	U	Y
h370	Causeway	Stone	Causeway is 50 feet long	U	Y
h379	Causeway	Stone		Y	
h421	Causeway	Stone		U	Y
hs55	Causeway	Stone	Causeway is 15 feet long	Y	
k33	Causeway	Stone	Causeway 20 feet long. Vegetation overgrowing feature	Y	
k34	Causeway	Stone	30-foot long causeway. Also here large coarse rock serves as trail tread	Y	
h1007	CheckDam	Stone		N	N
h1008	CheckDam	Stone		N	N
h1010	CheckDam	Stone		N	N
h1013	CheckDam	Stone		N	N

Note: This table lists the GPS feature points on each trail. The ID_ column corresponds to the trail name abbreviation located at the end of this table.

Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h1017	CheckDam	Stone		N	N
h1019	CheckDam	Stone		N	N
h1021	CheckDam	Stone	Note: rip rap trail tread gets wider as you get closer to trailhead, approximately 6 feet wide	N	N
h1022	CheckDam	Stone		N	N
h1024	CheckDam	Stone		N	N
h1025	CheckDam	Stone		N	N
h1027	CheckDam	Stone	Large dam, angular stones	N	N
h1029	CheckDam	Stone		N	N
h1031	CheckDam	Stone		N	N
h1032	CheckDam	Stone		N	N
h1037	CheckDam	Stone		U	N/U
h1039	CheckDam	Stone		N	N
h1041	CheckDam	Stone		N	N
h1042	CheckDam	Stone		N	N
h1046	CheckDam	Stone		N	N
h1048	CheckDam	Stone		N	N
h17	CheckDam	Wood		N	N
h18	CheckDam	Wood		N	N
h20	CheckDam	Wood	New trail alignment?	N	N
h24	CheckDam	Stone	Retaining wall is 7 feet long	U	U/Y
h310	CheckDam	Stone	Checkdam constructed using 6 stones	N	N
h311	CheckDam	Stone		N	N
h312	CheckDam	Stone	Trail tread is sunk	N	N
h334	CheckDam	Stone		N	N
h339	CheckDam	Stone		N	N
h402	CheckDam	Stone	Checkdam was constructed using 4 stones	N	U/Y
h413	CheckDam	Wood		N	N
h419	CheckDam	Stone		U	U
h424	CheckDam	Wood		N	N
h454	CheckDam	Stone		N	
h508	CheckDam	Stone	Constructed using 4 stones	N	Y
h520	CheckDam	Stone		U	U/N
h529	CheckDam	Stone	No point taken--GPS trouble	U	U
h537	CheckDam	Stone		N	N
h539	CheckDam	Stone		U	U
h556	CheckDam	Stone		U	U
h561	CheckDam	Stone		N	N
h562	CheckDam	Stone		N	N
h563	CheckDam	Stone		U	U

Note: This table lists the GPS feature points on each trail. The ID_ column corresponds to the trail name abbreviation located at the end of this table.

Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h571	CheckDam	Stone		N	N
h572	CheckDam	Stone		U	U/N
h573	CheckDam	Stone		N	N
h592	CheckDam	Stone		N	N
h608	CheckDam	Stone		N	N
h611	CheckDam	Stone		U	U/N
h614	CheckDam	Stone		U	U/N
h615	CheckDam	Stone	3 checkdams in a row, 1 eroded	N	N
h616	CheckDam	Stone	Broken checkdam	N	N
h624	CheckDam	Stone	Checkdam is located at the top of rip rap trail tread.	U	U
h635	CheckDam	Stone		N	N
h636	CheckDam	Stone	Non-functioning checkdam	U	U/N
h644	CheckDam	Stone		U	U/N
h646	CheckDam	Stone		N	N
h651	CheckDam	Stone		U	U/N
h652	CheckDam	Stone		N	N
h657	CheckDam	Stone	Constructed using 5 stones	N	N
h660	CheckDam	Stone		N	N
h663	CheckDam	Stone		N	N
h665	CheckDam	Stone		N	N
h667	CheckDam	Stone		N	N
h670	CheckDam	Stone		N	N
h673	CheckDam	Stone		N	N
h675	CheckDam	Stone		N	N
h677	CheckDam	Stone	2 checkdams	U	U/N
h681	CheckDam	Stone		N	N
h685	CheckDam	Stone		U	U/N
h691	CheckDam	Stone		U	U/N
h693	CheckDam	Stone		N	N
h695	CheckDam	Stone		N	N
h697	CheckDam	Stone		U	U/N
h699	CheckDam	Stone		N	N
h710	CheckDam	Stone		N	N
h713	CheckDam	Stone		N	N
h721	CheckDam	Stone		U	U/N
h725	CheckDam	Stone	Checkdam is buried and non-functioning	U	U/N
h734	CheckDam	Stone		U	U/N
h735	CheckDam	Stone	Constructed using 4 stones	N	N
h743	CheckDam	Stone	Constructed using 4 stones	U	U/N
h746	CheckDam	Stone		N	N
h751	CheckDam	Stone		N	N
h753	CheckDam	Stone		N	N

Note: This table lists the GPS feature points on each trail. The ID_ column corresponds to the trail name abbreviation located at the end of this table.

Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h757	CheckDam	Stone	Checkdam is 4 feet long	U	U/N
h767	CheckDam	Stone		N	N
h769	CheckDam	Stone		N	N
h779	CheckDam	Stone		N	N
h784	CheckDam	Stone		U	U/N
h799	CheckDam	Stone	Possibly two dams	N	N
h8	CheckDam	Stone	Attached to stone checkstep described above	N	N/U
h805	CheckDam	Stone		N	N
h807	CheckDam	Stone		N	N
h809	CheckDam	Stone	3 checkdams with large, angular stones	N	N
h811	CheckDam	Stone		N	N
h813	CheckDam	Stone	3 checkdams	N	N
h816	CheckDam	Stone		N	N
h823	CheckDam	Stone		N	N
h838	CheckDam	Stone		N	N
h839	CheckDam	Stone		N	N
h847	CheckDam	Stone		N	N
h860	CheckDam	Stone		N	N
h864	CheckDam	Stone		N	N
h865	CheckDam	Stone	Old trail alignment--10 new feet of trail	N	N
h872	CheckDam	Stone		N	N
h874	CheckDam	Stone	7 checkdams	N	N
h878	CheckDam	Stone	Constructed using 4 stones	N	N
h880	CheckDam	Stone		U	U/N
h882	CheckDam	Stone		N	N
h891	CheckDam	Stone		N	N
h897	CheckDam	Stone		N	N
h900	CheckDam	Stone		N	N
h907	CheckDam	Stone		N	N
h911	CheckDam	Stone	Checkdam and checkstep combined	N	N
h917	CheckDam	Stone		N	N
h919	CheckDam	Stone		N	N
h926	CheckDam	Stone		N	N
h932	CheckDam	Stone		N	N
h934	CheckDam	Stone		N	N
h936	CheckDam	Stone		N	N
h939	CheckDam	Stone		N	N
h941	CheckDam	Stone		N	N
h944	CheckDam	Stone		N	N
h946	CheckDam	Stone	Checkdam is 10 feet long--large	N	N

Note: This table lists the GPS feature points on each trail. The ID_ column corresponds to the trail name abbreviation located at the end of this table.

Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h950	CheckDam	Stone		N	N
h951	CheckDam	Stone		N	N
h954	CheckDam	Stone		N	N
h956	CheckDam	Stone		N	N
h957	CheckDam	Stone		N	N
h959	CheckDam	Stone		N	N
h962	CheckDam	Stone		N	N
h963	CheckDam	Stone		N	N
h965	CheckDam	Stone		N	N
h967	CheckDam	Stone		N	N
h968	CheckDam	Stone		N	N
h970	CheckDam	Stone		N	N
h972	CheckDam	Stone		N	N
h973	CheckDam	Stone		N	N
h976	CheckDam	Stone		N	N
h978	CheckDam	Stone		N	N
h984	CheckDam	Stone		N	N
h988	CheckDam	Stone	2 checkdams	N	N
h989	CheckDam	Stone	3 checkdams	N	N
h996	CheckDam	Stone		N	N
h998	CheckDam	Stone		N	N
hda16	CheckDam	Stone		N	N
hda18	CheckDam	Stone		N	N
hda21	CheckDam	Stone	Evidence of erosion on trail	N	N
hs28	CheckDam	Stone	Checkdam is approximately 7 feet long	N	U\N
hs30	CheckDam	Stone	Checkdam is 5 five long and was constructed using 4 stones.	N	U/N
hs4	CheckDam	Stone	Checkdam is 6 feet long was constructed using 3 stones	N	U/N
hs7	CheckDam	Stone and Wood	Likely built by SCA in the 1990s	N	N
hs8	CheckDam	Stone and Wood	Likely built by SCA in the 1990s	N	N
k18	CheckDam	Stone	degrading condition	N	Y
k7	CheckDam	Wood	wood checksteps described above.	N	N
PT 5	CheckDam	Stone		N	U/N
PT 7	CheckDam	Stone		N	U/N
s125	CheckDam	Stone	8 feet wide and was constructed	N	N/U
s130	CheckDam	Stone	Checkdam is 7 feet wide	N	N
s138	CheckDam	Stone	Unusually wide, at least 10 stones	N	N
s14	CheckDam	Stone	2 dams constructed using 4 stones.	N	U/N
s149	CheckDam	Stone	stones	N	N

Note: This table lists the GPS feature points on each trail. The ID_ column corresponds to the trail name abbreviation located at the end of this table.

Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
s15	CheckDam	Stone	Constructed by 4 "lava bombs"	N	N/U
s150	CheckDam	Stone		N	N
s151	CheckDam	Stone		N	N
s20	CheckDam	Stone		N	N/U
s24	CheckDam	Stone		N	Y/U
s25	CheckDam	Stone		N	Y/U
s27	CheckDam	Stone		N	N/U
s4	CheckDam	Stone	1990s work	N	N
s55	CheckDam	Stone		N	N
s56	CheckDam	Stone		N	N
s6	CheckDam	Stone	Evidence of erosion	N	N
s66	CheckDam	Stone		N	N
s69	CheckDam	Stone	A lot of the work near the top of the hill is new	N	N
s7	CheckDam	Stone	Evidence of erosion	N	N
h1020	CheckDam	Stone		N	N
h707	CheckDam	Stone		N	N
h948	CheckDam	Stone		N	N
h987	CheckDam	Stone		N	N
h992	CheckDams	Stone	3 checkdams	N	N
h1034	Check Step	Stone		U	N
h1044	Check Step	Stone	1 checkstep	N	N
h14	Check Step	Stone	New alignment?	U	U
h26	Check Step	Stone	1 checkstep	U	U
h29	CheckStep	Stone	3-foot wide checkstep constructed using 4 stones	N	U
h302	CheckStep	Stone	Contemporary stone edging along trail	U	N
h305	CheckStep	Stone		U	N
h314	CheckStep	Stone		N	N
h315	CheckStep	Stone		U	Y
h317	CheckStep	Stone		N	N
h318	CheckStep	Stone		N	N
h319	CheckStep	Stone		N	N
h321	CheckStep	Stone		U	Y
h324	CheckStep	Stone	2 checksteps	U	Y
h360	CheckStep	Stone	2 checksteps	U	Y
h361	CheckStep	Stone	Checksteps constructed using 3 stones	U	U
h376	CheckStep	Stone		U	Y
h403	CheckStep	Stone	Checkstep constructed using 3 stones	N	Y
h405	CheckStep	Wood	3 checksteps	N	N
h406	CheckStep	Stone	2 checksteps	U	Y

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h407	CheckStep	Stone	2 checksteps	U	Y
h409	CheckStep	Stone		U	Y
h416	CheckStep	Wood	1 checkstep	N	N
h420	CheckStep	Wood	7 checksteps	N	N
h422	CheckStep	Wood	2 checksteps	N	N
h428	CheckStep	Stone		U	Y
h431	CheckStep	Stone		U	Y
h432	CheckStep	Stone		N	N
h434	CheckStep	Stone		U	Y
h444	CheckStep	Wood	1 checkstep	N	N
h445	CheckStep	Stone	An odd checkstep	U	Y
h446	CheckStep	Stone	8 checksteps	N	N
h450	CheckStep	Wood	1 checkstep	N	N
h451	CheckStep	Stone	9 checksteps--slight trail realignment	U	N
h455	CheckStep	Stone	2 angular, modern steps	N	N
h461	CheckStep	Stone		U	N
h502	CheckStep	Stone		N	N
h519	CheckStep	Stone		N	Y
h525	CheckStep	Stone	2 checksteps	U	N
h531	CheckStep	Stone	No point taken--GPS trouble	U	N
h535	CheckStep	Stone		N	N
h540	CheckStep	Stone		N	N
h545	CheckStep	Stone		N	N
h550	CheckStep	Stone		N	N
h552	CheckStep	Stone		N	N
h569	CheckStep	Stone	On short abraded section of trail	N	N
h576	CheckStep	Stone	3 checksteps, both natural and cut	U	N
h577	CheckStep	Stone		U	N
h579	CheckStep	Stone		U	N
h581	CheckStep	Stone	2 checksteps	N	N
h594	CheckStep	Stone		N	N
h596	CheckStep	Stone	2 checksteps	U	U
h598	CheckStep	Stone		U	U
h621	CheckStep	Stone		U	N
h625	CheckStep	Stone	2 checksteps	N	N
h628	CheckStep	Stone		U	N
h634	CheckStep	Stone		N	N
h638	CheckStep	Stone	2 checksteps	U	N
h647	CheckStep	Stone		N	N
h659	CheckStep	Stone	1 checkstep	N	N
h662	CheckStep	Stone	1 checkstep	U	N
h687	CheckStep	Stone		U	N

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h688	CheckStep	Stone		N	N
h7	CheckStep	Stone	Checkstep attached to checkdam	U	N
h724	CheckStep	Stone		N	N
h733	CheckStep	Stone	1 checkstep	N	N
h737	CheckStep	Stone		N	N
h750	CheckStep	Stone	1 checkstep	N	N
h761	CheckStep	Stone		N	N
h777	CheckStep	Stone		N	N
h780	CheckStep	Stone	2 checksteps	N	N
h783	CheckStep	Stone	2 checksteps	N	N
h786	CheckStep	Stone	1 checkstep damaged by erosion	U	Y
h790	CheckStep	Stone	1 checkstep	N	N
h791	CheckStep	Stone	4 checksteps	N	N
h794	CheckStep	Stone	1 checkstep	N	N
h812	CheckStep	Stone	1 checkstep	U	N
h815	CheckStep	Stone	1 checkstep	N	N
h820	CheckStep	Stone	1 checkstep	N	N
h825	CheckStep		1 checkstep	N	N
h828	CheckStep	Stone		N	N
h830	CheckStep	Stone	2 checksteps	N	N
h837	CheckStep	Stone	2 checksteps	U	N
h843	CheckStep	Stone	1 checkstep	N	N
h845	CheckStep	Stone	1 checkstep	N	N
h850	CheckStep	Stone	2 checksteps	N	N
h856	CheckStep	Stone	1 checkstep	N	N
h858	CheckStep	Stone	1 checkstep	U	N
h901	CheckStep	Stone		N	N
h912	CheckStep	Stone	Likely that majority of work from this point to trailhead is modern	N	N
h913	CheckStep	Stone	Large, angular rocks	N	N
h933	CheckStep	Stone	1 checkstep	N	N
h938	CheckStep	Stone	3 checksteps. Overall character of trail: checksteps, some 1 foot high and hard to walkover. Checkdams are less difficult to navigate	N	N
h940	CheckStep	Stone	1 checkstep	N	N
h945	CheckStep	Stone	1 checkstep	N	N
h958	CheckStep	Stone	1 checkstep	N	N
h986	CheckStep	Stone		N	N
h995	CheckStep	Stone		N	N
h997	CheckStep	Stone		N	N
hda10	CheckStep	Stone		N	N
hda12	CheckStep	Stone	3 checksteps	N	N

Note: This table lists the GPS feature points on each trail. The ID_ column corresponds to the trail name abbreviation located at the end of this table.

Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
hda14	CheckStep	Stone	2 checksteps	N	N
hda19	CheckStep	Stone	7 checksteps	N	N
hda9	CheckStep	Stone		N	N
Hh5	CheckStep	Stone		U	N
hs12	CheckStep	Stone	1 stone step, with D2a stepping stone under. General character of trail: 1-2 feet wide, sand/cinder and small lava stone serve as trail tread.	U	Y
hs14	CheckStep	Stone		U	N
hs18	CheckStep	Stone	Step approximately 4 feet wide	N	Y
hs20	CheckStep	Stone	4 steps on historic alignment	U	N
hs27	CheckStep	Stone		U	U
hs42	CheckStep	Stone	1 checkstep. Character of trail here is abraded and it traverses smooth lava flow.	U	N
hs44	CheckStep	Stone	1 checkstep--tool marks visible	N	N
k103	CheckStep	Wood		N	N
k105	CheckStep	Wood		N	N
k21	CheckStep	Stone	1 checkstep. Trail is 2-4 feet wide, sharp edges, steep grade, eroded, natural rock protruding	N	U
k25	CheckStep	Wood	25 checkstep sand 2 checkdams. Checksteps are roughly 2-3 feet wide. Trail terrain, drops of both sides, view of notch where trail enters crater	N	N
k37	CheckStep	Stone	Cut rock step. Natural rock cut into 1 step. General Note: Portions of trail have deep gullies along trail.	U	
k79	CheckStep	Stone	Natural looking, 6 checksteps	U	Y
k99	CheckStep	Wood	1 checkstep	N	N
PT 3	CheckStep	Wood and Stone	9 checksteps--combination of wood and stone steps. Likely constructed by the SCA in the 1990s	N	N
PT 4	CheckStep	Wood	2 checksteps	N	N
PT 6	CheckStep	Wood		N	N
s10	CheckStep	Stone	1 checkstep. Trail is widened as people/horses walk around the step instead of over.	N	N
s110	CheckStep	Stone	Contemporary work, ca. 1980s	N	N

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
s111	CheckStep	Stone	Contemporary work, ca. 1980s--constructed using 3 stones, measuring 4 feet wide	N	N
s140	CheckStep	Stone	2 large stones	N	N
s143	CheckStep	Stone	Near a small patch of rip rap trail tread	N	N
s156	CheckStep	Stone		N	N
s158	CheckStep	Stone	1 step between rip rap trail tread	N	N
s16	CheckStep	Wood	5 checksteps	N	N
s160	CheckStep	Stone	1 checkstep between rip rap trail tread	N	N
s166	CheckStep	Stone	1 checkstep	N	N
s167	CheckStep	Stone	1 checkstep	N	N
s169	CheckStep	Stone	1 checkstep	N	N
s173	CheckStep	Stone	1 checkstep	N	N
s178	CheckStep	Stone		U	N
s18	CheckStep	Wood	9 checksteps	N	N
s21	CheckStep	Wood	3 modified checksteps	N	N
s26	CheckStep	Wood	Modified checkstep	N	N
s31	CheckStep	Stone	2 checksteps	N	Y
s47	CheckStep	Stone	Largely unused due to shifting trail alignment	N	N
s49	CheckStep	Stone		N	Y
s67	CheckStep	Stone		N	N
h453	CheckStep	Wood	12 checksteps	N	N
h745	CheckStep	Stone	3 checksteps	N	N
h834	CheckStep	Stone	1 checkstep	N	N
h1026	CheckSteps	Stone	3 checksteps	N	N
h1028	CheckSteps	Stone	2 checksteps	N	N
h1036	CheckSteps	Stone	4 checksteps	N	N
h1038	CheckSteps	Stone	4 checksteps	N	N
h1040	CheckSteps	Stone	14 checksteps--loose stones on downhill side	N	N
h1045	CheckSteps	Stone	3 checksteps	N	N
h1047	CheckSteps	Stone	9 checksteps	N	N
h1049	CheckSteps	Stone	2 checksteps	N	N
h1050	CheckSteps	Stone	9 checksteps	N	N
h15	CheckSteps	Wood	New alignment. 5 checksteps, 30 feet between each step	N	N
h16	CheckSteps	Wood	4 checksteps on a new alignment. Checkdam in middle	N	N
h19	CheckSteps	Wood	24 checksteps on a presumably new trail alignment	N	N
h2	CheckSteps	Stone	6 checksteps--abraded alignment	U	Y

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h25	CheckSteps	Stone	4 checksteps, poor workmanship	U	Y
h3	CheckSteps	Stone	1 checkstep on a new alignment	N	U
h328	CheckSteps	Stone	3 checksteps topography dictates trail alignment in this area	U	Y
h329	CheckSteps	Stone	2 checksteps	U	Y
h332	CheckSteps	Stone	6 checksteps	U	Y
h335	CheckSteps	Stone		U	U
h340	CheckSteps	Stone	9 checksteps	U	N
h347	CheckSteps	Stone	3 checksteps	U	Y
h382	CheckSteps	Stone	4 checksteps located near cabin	U	N
h4	CheckSteps	Stone	Multiple steps on new alignment	N	U
h412	CheckSteps	Wood	4 checksteps	N	N
h426	CheckSteps	Wood	2 checksteps	N	N
h427	CheckSteps	Wood	5 checksteps	N	N
h456	CheckSteps	Wood	2 checksteps	N	N
h457	CheckSteps	Stone	2 angular, modern steps	N	N
h509	CheckSteps	Stone		N	N
h511	CheckSteps	Stone	3 checksteps	N	N
h515	CheckSteps	Stone		N	Y
h528	CheckSteps	Stone	2 checksteps	N	N
h554	CheckSteps	Stone	3 checksteps	U	U
h559	CheckSteps	Stone	2 checksteps	U	N
h584	CheckSteps	Stone	4 checksteps	N	N
h601	CheckSteps	Stone	2 checksteps	N	N
h602	CheckSteps	Stone		U	U
h603	CheckSteps	Stone	2 checksteps	N	N
h604	CheckSteps	Stone	2 checksteps	N	N
h617	CheckSteps	Stone	3 checksteps	N	N
h619	CheckSteps	Stone	3 modern checksteps	N	N
h631	CheckSteps	Stone	5 checksteps	N	N
h654	CheckSteps	Stone	3 checksteps	N	N
h656 or 655	CheckSteps	Stone	3 checksteps	N	N
h658	CheckSteps	Stone	2 checksteps	N	N
h666	CheckSteps	Stone	5 checksteps	N	N
h680	CheckSteps	Stone	2 checksteps	N	N
h683	CheckSteps	Stone	4 checksteps	N	N
h704	CheckSteps	Stone	4 checksteps	N	N
h709	CheckSteps	Stone		N	N
h712	CheckSteps	Stone	4 checksteps	N	N
h716	CheckSteps	Stone	7 checksteps	N	N
h720	CheckSteps	Stone	4 checksteps	N	N
h727	CheckSteps	Stone	4 checksteps	N	N
h729	CheckSteps	Stone	1 checkstep	N	N

Note: This table lists the GPS feature points on each trail. The ID_ column corresponds to the trail name abbreviation located at the end of this table.

Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h739	CheckSteps	Stone	9 checksteps, likely 1990s work	N	N
h744	CheckSteps	Stone	13 checksteps, likely 1990s work	N	N
h754	CheckSteps	Stone	5 checksteps	N	N
h758	CheckSteps	Stone	6 checksteps	N	N
h763	CheckSteps	Stone	2 checksteps	U	N
h764	CheckSteps	Stone	2 checksteps	U	N
h774	CheckSteps	Stone	2 checksteps	U	N
h796	CheckSteps	Stone	3 checksteps	N	N
h798	CheckSteps	Stone	3 checksteps	N	N
h810	CheckSteps	Stone	3 checksteps	N	N
h818	CheckSteps	Stone	5 checksteps	N	N
h832	CheckSteps	Stone	1 checkstep	N	N
h840	CheckSteps	Stone		N	N
h861	CheckSteps	Stone	2 checksteps, likely 1990s work	N	N
h889	CheckSteps	Stone	4 checksteps	N	N
h9	CheckSteps	Stone	6 checksteps. Erosion evident-- combination of natural and checksteps	U	U
h909	CheckSteps	Stone	3 checksteps	N	N
h915	CheckSteps	Stone	6 checksteps	N	N
h921	CheckSteps	Stone	2 checksteps	N	N
h927	CheckSteps	Stone	2 checksteps	N	N
h931	CheckSteps	Stone	4 checksteps	N	N
h935	CheckSteps	Stone	9 checksteps	N	N
h942	CheckSteps	Stone	2 checksteps	N	N
h947	CheckSteps	Stone	2 checksteps	N	N
h949	CheckSteps	Stone	2 checksteps	N	N
h983	CheckSteps	Stone	2 checksteps	N	N
hda17	CheckSteps	Stone	4 checksteps	N	N
hda23	CheckSteps	Stone	6 checksteps	N	N
hda25	CheckSteps	Stone	4 checksteps	N	N
hs15	CheckSteps	Wood	2 checksteps. Each step approximately 4 feet wide	N	N
hs2	CheckSteps	Wood	Steps are spaced five feet apart--total of 21 checksteps and one checkdam	N	N
hs22	CheckSteps	Stone	2 checksteps	U	U
hs25	CheckSteps	Stone	12 checksteps	N	N
hs33	CheckSteps	Stone	2 checksteps, 3 feet wide	U	U
hs34	CheckSteps	Stone	9 checksteps	U	U
hs37	CheckSteps	Stone	4 checksteps	U	N
hs38	CheckSteps	Stone	1 checkstep	U	Y
hs41	CheckSteps	Stone	4 checksteps	U	Y
hs45	CheckSteps	Stone	2 checksteps	U	N

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
hs49	CheckSteps	Stone	2 checksteps	U	N
hs50	CheckSteps	Stone	3 checksteps--not likely historic since these are located on realignment	N	N
hs54	CheckSteps	Stone	2 checksteps	U	N
hs58	CheckSteps	Wood	6 checksteps--15 feet between each step	N	N
hs6	CheckSteps	Wood and Stone	37 checksteps--some are combination wood/stone steps. According to Peter Kafka, these were constructed by the SCA in the 1990s.	N	N
k19	CheckSteps	Wood	47 checksteps, punctuated by 3 checkdams	N	N
k20	CheckSteps	Stone	2 checksteps constructed using rough-cut stones	U	N
k23	CheckSteps	Wood	46 checksteps are situated close together along with 1 checkdam. In places, the trail is sunken with steep natural wall/cut. Trail tread is rubble	N	N
k6	CheckSteps	Wood	Checksteps are approximately 2-3 feet apart. A total of 110 wood checks on this segment of trail. Steps are punctuated by 5 wood checkdams. Each step is 3 feet wide, which dictates trail width	N	N
k75	CheckSteps	Stone	37 checksteps, some with visible tool marks	N	Y
k77	CheckSteps	Stone	5 checksteps	U	Y
k84	CheckSteps	Stone	4 checksteps	U	Y
k92	CheckSteps	Stone	7 checksteps--rough-cut stones	U	Y
k94	CheckSteps	Wood	3 checksteps	N	N
k95	CheckSteps	Wood	1 checkstep	N	N
PT 10	CheckSteps	Wood	18 checksteps. Trail alignment here is slightly abraded due to erosion and horse use	N	N
PT 8	CheckSteps	Wood	15 checksteps	N	N
s11	CheckSteps	Stone	1 checkstep	N	N
s112	CheckSteps	Stone	Series of contemporary checksteps. 34 checksteps, approximately 15 feet apart, 3-4 stones per structure	N	N

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
s116	CheckSteps	Stone	Series of contemporary checksteps. There are 32 checksteps, approximately 2-4 feet apart. In most cases 2-3 stones were used to construct each step. Trail alignment is 3-4 feet wide.	N	N
s119	CheckSteps	Stone	There are 2 checksteps between the rip rap trail tread	N	N
s12	CheckSteps	Wood	15 feet between each step-- 5 checksteps	N	N
s126	CheckSteps	Stone	5 checksteps	N	N
s13	CheckSteps	Wood	13 checksteps	N	N
s133	CheckSteps	Stone	4 checksteps	N	N
s137	CheckSteps	Stone	2 checksteps	N	N
s145	CheckSteps	Stone	4 checksteps	N	N
s153	CheckSteps	Stone	4 checksteps	N	N
s155	CheckSteps	Stone	2 checksteps, one point taken	N	N
s159	CheckSteps	Stone	2 steps between rip rap trail tread	N	N
s162	CheckSteps	Stone	4 checksteps	N	N
s164	CheckSteps	Stone	7 checksteps	N	N
s171	CheckSteps	Stone	3 checksteps	N	N
s175	CheckSteps	Wood	11 checksteps	N	N
s180	CheckSteps	Wood	1 checkstep	N	N
s181	CheckSteps	Wood	15 checksteps	N	N
s183	CheckSteps	Wood	2 checksteps	N	N
s184	CheckSteps	Wood	4 checksteps	N	N
s185	CheckSteps	Wood	4 checksteps	N	N
s186	CheckSteps	Wood	3 checksteps. Trail is approximately 3-4 feet wide and traverses aa flow. Trail tread is varied, with some mixed larger course volcanic rock as well as a sand/cinder base.	N	N
s187	CheckSteps	Wood	7 checksteps	N	N
s188	CheckSteps	Wood	7 checksteps	N	N
s189	CheckSteps	Stone	2 checksteps	U	Y
s190	CheckSteps	Wood	6 checksteps	N	N
s191	CheckSteps	Wood	8 checksteps	N	N
s2	CheckSteps	Stone	4 sets of steps	N	N
s23	CheckSteps	Stone	3 checksteps	N	N
s29	CheckSteps	Stone	8 checksteps	N	N
s3	CheckSteps	Stone	1 checkstep	N	N

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
s37	CheckSteps	Stone	3 checksteps--tool mark on stone	N	N
s40	CheckSteps	Stone	5 checksteps	N	Y
s5	CheckSteps	Stone	2 steps, erosion evident as people and horses are stepping around the	N	N
s51	CheckSteps	Stone	2 checksteps	N	Y
s53	CheckSteps	Stone		N	Y
s59	CheckSteps	Stone		N	Y
s62	CheckSteps	Stone		U	Y
s64	CheckSteps	Wood	20 checksteps. New stone edging along wood checksteps	N	N
s71	CheckSteps	Stone	3 checksteps	N	N
s8	CheckSteps	Stone	Trail is rough as it goes over AA. 6 checksteps	N	N
SS121	CheckSteps	Stone	There are 9 checksteps. Most often, 1-2 stones was used in the construction of each step and there is 5 feet between each step. The trail is between 4-6 feet wide.	N	N
h544	Concrete Patch	Concrete	Unknown concrete patch on trail. Appears to be a relatively recent--no patina	N	N
h741	Concrete Patch	Concrete	Concrete patch installed in 1980s?	N	N
h1023	Culvert	Steel	Rip rap over steel culvert	N	N
h380	Culvert	Steel	2 stone contemporary headwalls	N	N
h929	Culvert	Steel		N	N
h10	Edging	Stone	Likely contemporary edging	N	Y
h327	Edging	Stone		N	Y
h443	Edging	Stone		U	Y
h458	Edging	Stone		N	Y
h464	Edging	Stone	Single line of stones	N	Y
h605	Edging	Stone	Located on the inside of the trail. May have been built to serve as a gutter. Not likely historic.	N	Y
h642	Edging	Stone	Trail edging is 25 feet long	U	Y
h664	Edging	Stone	Trail edging is 10 feet long	Y	Y
h749	Edging	Stone	Single course of stones	N	Y
h792	Edging	Stone	On inside of trail--likely from a recent rockslide	N	Y
h848	Edging	Stone	Edging is 20 feet long--small piles of stone along trail	N	Y
h890	Edging	Stone	Jumbled stone edging	N	Y

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h894	Edging	Stone	Edging is 30 feet long and is a single course of stones	N	Y
h899	Edging	Stone	Rubble-like edging	N	Y
h906	Edging	Stone	Rubble-like edging	N	Y
h916	Edging	Stone	Single course of stones--social trail goes around it	U	Y
h922	Edging	Stone	Single course of stones	N	Y
h925	Edging	Stone	Edging is 10 feet long	N	Y
h943	Edging	Stone	2 courses of stones, rubble-like	N	Y
h953	Edging	Stone	Edging is 20 feet long and jumbled	N	Y
h966	Edging	Stone	Edging is 20 feet long and 1 to 2 feet high	N	Y
h971	Edging	Stone	Edging is 25 feet long and 2 feet high--trail surface is rutted	N	Y
h974	Edging	Stone	Edging is 50 feet long and is one course of jumbled stones	N	Y
h979	Edging	Stone	Edging is 20 feet long and 2 feet tall. Heavy erosion. Edging fairly well built on the uphill side of the trail	N	Y
h981	Edging	Stone	Edging is rip rap-like. Edging on both sides of trail, although uphill edging exhibits better craftsmanship.	N	Y
h993	Edging	Stone	Edging is 60 feet long and 1 foot high. Located on uphill side of trail and jumbled	N	Y
hs29	Edging	Stone	Subtle edging extends for approximately 25 feet.	N	Y
hs3	Edging	Stone	Edging on both sides of trail for approximately 10-15 feet	N	Y
hs53	Edging	Stone	Edging is 15 feet long	N	Y
k35	Edging	Stone	20 foot long, 2 foot high native stone edging	U	Y
k47	Edging	Stone	Edging approximately 55 feet long	U	Y
k56	Edging	Stone	Edging approximately 40 feet long	U	Y
k66	Edging	Stone	Edging 40 feet long, native lava stone pushed to side of trail--poor craftsmanship	U	Y
k72	Edging	Stone	Rubble edging that is 15 feet long	U	Y

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
PT 2	Edging	Stone	General character of trail: scrub, slightly sunken, 2 feet wide and soil/small stone tread	N	Y
hda26	Edging	Stone	Single stones edging the trail	N	Y
s17	Edging	Stone	Possible old trail alignment	N	Y
s39	Edging	Stone	2 parallel lines of edging showing old alignment of trail	N	Y
s50	Edging	Stone		N	Y
s54	Edging	Stone	Small section of possible realignment	N	Y
h333	End of CheckSteps	Stone			
h338	End of CheckSteps	Stone	5 checksteps		
h342	End of CheckSteps	Stone			
h447	End of CheckSteps	Stone			
h452	End of CheckSteps	Stone			
h5	End of CheckSteps	Stone	End point of intermittent checksteps through section		
hs35	End of CheckSteps	Stone			
hs5	End of CheckSteps	Wood	See hs2 for description		
hs9	End of CheckSteps	Stone and Wood	See hs6 for description		
k22	End of CheckSteps	Wood	See K19 for description		
k24	End of CheckSteps	Wood	See K23 for description		
k26	End of CheckSteps	Wood	See K25 for description		
k76	End of CheckSteps	Stone	See K75 for description		
k8	End of CheckSteps	Wood	See K6 for description		
PT 9	End of CheckSteps	Wood	See PT 8 for description		
s113	End of CheckSteps	Stone	34 checksteps-- vegetation type shifts		
s117	End of CheckSteps	Stone	See SS116 for description		

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
s122	End of CheckSteps	Stone	See SS122 for description		
s127	End of CheckSteps	Stone	See SS126 for description		
s134	End of CheckSteps	Stone	See SS133 for description		
s146	End of CheckSteps	Stone	See SS145 for description		
s154	End of CheckSteps	Stone	See SS153 for description		
s163	End of CheckSteps	Stone	See SS163 for description		
s165	End of CheckSteps	Stone	See SS164 for description		
s172	End of CheckSteps	Stone	See SS171 for description		
s176	End of CheckSteps	Wood	See SS175 for description		
s182	End of CheckSteps	Wood	See SS181 for description		
s57	End of CheckSteps	Stone			
s65	End of CheckSteps	Wood	From beginning of wood checks there are scattered stones lining the edges of the trail extending nearly to the trailhead		
hs26	End of CheckSteps	Stone			
h990	End of Edging	Stone	See H981 for description		
hs11	End of Natural Cut Trail Tread	Stone	See HS10 for description		
hs16	End of Natural Cut Trail Tread	Stone	See HS13 for description		
hs32	End of Natural Cut Trail Tread	Stone			
s106	End of Natural Feature		End of cinder field		
h355	End of Retaining Wall	Stone			
h517	End of Retaining Wall	Dry laid Stone	See H513 for description		
h676	End of Retaining Wall	Dry laid Stone	See H674 for description		

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h682	End of Retaining Wall	Dry laid Stone	See H679 for description		
h689	End of Retaining Wall	Dry laid Stone	See H686 for description		
h698	End of Retaining Wall	Dry laid Stone	See H696 for description		
h702	End of Retaining Wall	Dry laid Stone	See H701 for description		
h705	End of Retaining Wall	Dry laid Stone	See H703 for description		
h730	End of Retaining Wall	Dry laid Stone	See H718 for description		
h736	End of Retaining Wall	Dry laid Stone	See H732 for description		
h742	End of Retaining Wall	Dry laid Stone	See H738 for description		
h755	End of Retaining Wall	Dry laid Stone	See H748 for description		
h781	End of Retaining Wall	Dry laid Stone	See H776 for description		
h785	End of Retaining Wall	Dry laid Stone	See H782 for description		
h808	End of Retaining Wall	Dry laid Stone	See H804 for description		
h821	End of Retaining Wall	Dry laid Stone	See H814 for description		
h827	End of Retaining Wall	Dry laid Stone	See H826 for description		
h841	End of Retaining Wall	Dry laid Stone	See H836 for description		
h846	End of Retaining Wall	Dry laid Stone	See H844 for description		
h541	End of Retaining Wall	Dry laid Stone	See H538 for description		
h555	End of Retaining Wall	Dry laid Stone	See H553 for description		
h583	End of Retaining Wall	Dry laid Stone	See H578 for description		
h593	End of Retaining Wall	Dry laid Stone	See H590 for description		
h684	End of Retaining Wall	Dry laid Stone	See H682a for description		
h762	End of Retaining Wall	Dry laid Stone	See H760 for description		

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h800	End of Retaining Wall	Dry laid Stone	See H797 for description		
h1009	End of Rip Rap Trail Tread	Stone	See H999 for description		
h1030	End of Rip Rap Trail Tread	Stone	See H1012 for description		
h506	End of Rip Rap Trail Tread	Stone			
h711	End of Rip Rap Trail Tread	Stone	See H708 for description		
h723	End of Rip Rap Trail Tread	Stone	See H722 for description		
h879	End of Rip Rap Trail Tread	Stone	See H862 for description		
h884	End of Rip Rap Trail Tread	Stone	See H881 for description		
h895	End of Rip Rap Trail Tread	Stone	See H886 for description		
h904	End of Rip Rap Trail Tread	Stone	See H896 for description		
h908	End of Rip Rap Trail Tread	Stone	See H905 for description		
h923	End of Rip Rap Trail Tread	Stone	See H920 for description		
h982	End of Rip Rap Trail Tread	Stone	See H977 for description		
hs24	End of Rip Rap Trail Tread	Stone			
s120	End of Rip Rap Trail Tread	Stone	See SS118 for description		
s124	End of Rip Rap Trail Tread	Stone	See s123 for description		
s129	End of Rip Rap Trail Tread	Stone	See SS128 for description		
s132	End of Rip Rap Trail Tread	Stone	See SS132 for description		
s136	End of Rip Rap Trail Tread	Stone	See SS135 for description		
s142	End of Rip Rap Trail Tread	Stone	See SS141 for description		
s148	End of Rip Rap Trail Tread	Stone	See SS147 for description		
s161	End of Rip Rap Trail Tread	Stone	See SS157 for description		

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
BY 4	End of Trail		End of Y trail		
cc7	End of Trail		End of CCC Trail Loop		
h1051	End of Trail		Junction with trail head near parking area. Overall, work on the last .7 of a mile of the trail is almost all contemporary. Stone work as seen on dams and checksteps is large, angular and has tool marks.		
h108	End of Trail		See H35 for last point		
h207	End of Trail		Trail junction with Cinder Cone Trail		
Hh9	End of Trail		End of Horse Hitch Trail		
LY 2	End of Trail		Trail very similar to the Right Y, but there are no rock cairns present	Y	
PT 11	End of Trail		Trail documentation ended at the campground		
RY 6	End of Trail		Trail junction with Left Y and base of Y		
s104	End of Trail		End of abraded trail. Individual abraded trails are approximately 1-2 feet wide. As the trails merge, the primary trail widens to approximately 7 feet wide.		
s192	End of Trail		Trail junction with Halemau'u. 1.3 miles to Paliku Cabin		
s72	End of Trail		Trail reaches trailhead near parking area		
h467	Gate	Wood and Metal	Gate to switchbacks	U/N	U/N
h1005	Gutter	Stone	Gutter or ditch is 25 feet long and 1 foot wide. It is contemporary work. Located on inside of trail, gutter forces water to checkdam below.	N	N
h1011	Gutter	Stone	Gutter or ditch is 20 feet long. It is contemporary work. Located on the uphill side of trail	N	N
h1015	Gutter	Stone	Gutter or ditch is 20 feet long. It is contemporary work. Located on uphill side of trail	N	N

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h1018	Gutter	Stone	Gutter or ditch 15 feet long. It is contemporary work. Located on uphill side of trail	N	N
h1000	Integrity Point		Point on trail and where a 10 person crew in 1992 did a lot of work, which included construction of checksteps		
h36	Integrity Point		From this point to the junction with Halemau'u (HS) likely lost integrity. Some points of trail are on the original alignment, while multiple points have been realigned. (Approximately 2.8 miles from junction with Halemau'u.)		
ccKC 1	Linear Trail Feature		Linear GPS feature taken. Alignment is likely that shown on park map. Social trails associated with shortcut. Trail width is 10-15 feet wide, narrowing to 4-5 feet in places. Could get lost on trail. Hard to see. Few, if any, built features on trail. Possible natural tread cut. Trail is non-contributing. Does not appear on 1930s era maps. Park staff doesn't know when it was established, although it was likely in the 1970s as a shortcut.	N	U
h6	Linear Trail Feature		Old trail and new trail alignments. Southern route historic. 50% of trail tread cut. No steps, dams or walls. Trail travels through aa, which may reflect a more intact alignment.		
h852	Retaining Wall (2)		Rainbow Bridge. Retaining walls on both side of bridge, which is at least 20 feet long and 10 feet high. Amazing views to crater on one side and to lush vegetation on the other.	Y	
hs19	Linear Trail Feature		North trail alignment is historic		

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
k27	Meadow		Grassy opening in a dense shrubby area. Alignment is likely variable here. Trail is 1 foot wide and sunken with abrading alignments in several locations		
k63	Meadow		Open meadow. Braided trail alignment and heavy vegetation		
h11	Natural Cut Step	Stone	Step cut into natural rock cut	Y	
h353	Natural Cut Step	Stone		U	Y
h357	Natural Cut Step	Stone	2 stone steps	Y	
h430	Natural Cut Steps	Stone	2 checksteps	N	Y
h854	Natural Cut Steps	Stone	3 checksteps	Y	
hs43	Natural Cut Steps	Stone	Step cut into smooth lava flow	Y	
h205	Natural Feature		Trail may have provided visitor access to this unique volcanic feature, Kawiliau	Y	
BY 2	Natural Tread Cut	Stone		Y	
h102	Natural Tread Cut	Stone	Possible step at bottom of cut.	Y	
h103	Natural Tread Cut	Stone	Natural trail tread cut is 15 feet long	Y	
h104	Natural Tread Cut	Stone	Natural trail tread cut is 10 feet long	Y	
h105	Natural Tread Cut	Stone	Eroded	Y	
h106	Natural Tread Cut	Stone	Tread cut through thin layer of rock	Y	
h107	Natural Tread Cut	Stone		Y	
h13	Natural Tread Cut	Stone		Y	
h203	Natural Tread Cut	Stone		Y	
h21	Natural Tread Cut	Stone	Likely back on historic alignment marked by 40 foot long natural tread cut	Y	

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h303	Natural Tread Cut	Stone		Y	
h304	Natural Tread Cut	Stone		Y	
h307	Natural Tread Cut	Stone		Y	
h316	Natural Tread Cut	Stone		Y	
h322	Natural Tread Cut	Stone		Y	
h323	Natural Tread Cut	Stone		Y	
h325	Natural Tread Cut	Stone		Y	
h33	Natural Tread Cut	Stone	Cut Step	Y	
h330	Natural Tread Cut	Stone		Y	
h349	Natural Tread Cut	Stone		Y	
h373	Natural Tread Cut	Stone		Y	
h375	Natural Tread Cut	Stone		Y	
h404	Natural Tread Cut	Stone		Y	
h408	Natural Tread Cut	Stone		Y	
h410	Natural Tread Cut	Stone		U	Y
h415	Natural Tread Cut	Stone		Y	
h417	Natural Tread Cut	Stone		U	Y
h440	Natural Tread Cut	Stone	The natural cut trail tread is 20 feet long	Y	
h441	Natural Tread Cut	Stone		Y	
h459	Natural Tread Cut	Stone	In this area, portions of the trail are abraded for a short section.	Y	
h460	Natural Tread Cut	Stone		Y	
h462	Natural Tread Cut	Stone		Y	

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ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h463	Natural Tread Cut	Stone		Y	
h465	Natural Tread Cut	Stone	Trail in this area is slightly rutted. Trail in grassy, flat area has several alignments. Current alignment in relatively straight and once may have been more curvilinear.	Y	
h514	Natural Tread Cut	Stone		Y	
h518	Natural Tread Cut	Stone		Y	
h532	Natural Tread Cut	Stone	2 natural trail cuts adjacent to each other	Y	
h612	Natural Tread Cut	Stone		Y	
hda8	Natural Tread Cut	Stone	Trail alignment down from the Shed to Holua. Peter Kafka reports that most of this work was contemporary.	N	U
Hh2	Natural Tread Cut	Stone		Y	
Hh3	Natural Tread Cut	Stone		Y	
Hh4	Natural Tread Cut	Stone		Y	
hs10	Natural Tread Cut	Stone	Erosion evident--tread ends with a cut step	Y	
hs13	Natural Tread Cut	Stone	Some checksteps between natural cut trail tread	Y	Y
hs21	Natural Tread Cut	Stone	Natural cut trail tread is 20 feet long	Y	
hs31	Natural Tread Cut	Stone		Y	
hs36	Natural Tread Cut	Stone	Natural cut trail tread is 40 feet long	Y	
hs39	Natural Tread Cut	Stone	Trail tread is 20 feet long	Y	
k107	Natural Tread Cut	Stone		Y	
k98	Natural Tread Cut	Stone	Leveled solid rock surface	Y	
s115	Natural Tread Cut	Stone		Y	

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Trail System Features

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ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
s30	Natural Tread Cut	Stone	30 feet of tread cut trail, although adjacent trail has been slightly realigned.	Y	
s32	Natural Tread Cut	Stone	30 feet of tread cut trail, although adjacent trail has been slightly realigned	Y	
s45	Natural Tread Cut	Stone		Y	
s9	Natural Tread Cut	Stone		Y/U	Y
h1002	None				
h1003	None				
h1004	None				
h1014	Open Culvert	Stone	Lined with rip rap tread on bottom	N	N
h1016	Open Culvert	Stone	Low point on trail. Major drainage area	N	N
h867	Open Culvert	Stone	Open culvert 2 feet wide. Bound on both sides.	N	N
h871	Open Culvert	Stone	Open culvert is 5 feet wide	N	N
h875	Open Culvert	Stone	Open culvert is 3 feet wide	N	N
h887	Open Culvert	Stone	Open culvert is 3 feet wide	N	N
h898	Open Culvert	Stone	Open culvert is 5 feet wide and filled with rip rap trail tread	N	N
h902	Open Culvert	Stone	Open culvert is 5 feet wide	N	N
h903	Open Culvert	Stone	Rip rap trail tread inside open culvert	N	N
h914	Open Culvert	Stone	Open culvert is 3 feet wide and bound on both sides by stones	N	N
h980	Open Culvert	Stone	Open culvert is 2 feet wide	N	N
s41	Quarry	Stone	Possible quarry location	U	U
h22	Retaining Wall	Dry laid Stone	Rip rap-like retaining wall with stones bordering trail edge	U	Y
h23	Retaining Wall	Dry laid Stone	Retaining wall is 6 feet long	U	Y
h31	Retaining Wall	Dry laid Stone		Y	
h331	Retaining Wall	Dry laid Stone	The trail has experienced erosion as a result the wall appears as a gaurdwall, although it likely that it was originally a retaining wall.	U	
h337	Retaining Wall	Dry laid Stone		U	Y

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CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h341	Retaining Wall	Dry laid Stone		U	Y
h348	Retaining Wall	Dry laid Stone	Rubble-like retaining wall	U	Y
h352	Retaining Wall	Dry laid Stone	Retaining wall is 40 feet long	Y	
h354	Retaining Wall	Dry laid Stone		Y	
h358	Retaining Wall	Dry laid Stone	25-feet of rubble-like retaining wall	Y	
h362	Retaining Wall	Dry laid Stone	Great example of a retaining wall	Y	
h363	Retaining Wall	Dry laid Stone		Y	
h364	Retaining Wall	Dry laid Stone	Rubble-like sections of wall, 80 feet long	Y	
h369	Retaining Wall	Dry laid Stone	Low rubble-like wall, 60 feet long	U	Y
h372	Retaining Wall	Dry laid Stone	Rubble-like retaining wall, 30 feet long	U	Y
h374	Retaining Wall	Dry laid Stone	Retaining wall is 7 feet long	Y	
h414	Retaining Wall	Dry laid Stone		N	U
h433	Retaining Wall	Dry laid Stone		Y	
h435	Retaining Wall	Dry laid Stone	40 feet long--great example of a retaining wall	Y	
h437	Retaining Wall	Dry laid Stone		Y	
h438	Retaining Wall	Dry laid Stone	The retaining wall is 30 feet long and 3 feet high	Y	
h439	Retaining Wall	Dry laid Stone	The retaining wall is 10 feet long	Y	
h442	Retaining Wall	Dry laid Stone	Small gap in the length of the wall. The wall is 30 feet long and 2-4 feet tall	Y	
h503	Retaining Wall	Dry laid Stone	Large angular base stones, wall 2-3 courses high	Y	
h507	Retaining Wall	Dry laid Stone	Retaining wall is 20 feet long and 3 feet high	Y	
h513	Retaining Wall	Dry laid Stone		Y	
h521	Retaining Wall	Dry laid Stone	Retaining wall is 40 feet long, ranges from 1-10 feet tall	Y	

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h522	Retaining Wall	Dry laid Stone	Wall is 20 feet long, 6 feet high and is associated with a switchback	Y	
h527	Retaining Wall	Dry laid Stone	Retaining wall is 10 feet long and 4 feet high	Y	
h530	Retaining Wall	Dry laid Stone	Retaining wall is 8 feet long and 6 feet tall	Y	
h533	Retaining Wall	Dry laid Stone	Retaining wall is 5 feet long and 2-4 feet tall	Y	
h534	Retaining Wall	Dry laid Stone	60 feet long, 2-5 feet tall	Y	
h538	Retaining Wall	Dry laid Stone	Retaining wall is 2-4 feet tall	Y	
h543	Retaining Wall	Dry laid Stone	60-foot long retaining wall associated with switchback	Y	
h547	Retaining Wall	Dry laid Stone	Retaining wall is 20 feet long	Y	
h549	Retaining Wall	Dry laid Stone	15-foot long retaining wall is associated with switchback	Y	
h553	Retaining Wall	Dry laid Stone	Good example of retaining wall	Y	
h558	Retaining Wall	Dry laid Stone	35-foot long retaining wall is associated with switchback	Y	
h560	Retaining Wall	Dry laid Stone	Retaining wall is 15 feet long and 3 feet tall	Y	
h566	Retaining Wall	Dry laid Stone	Rip rap retaining wall covered with grassy vegetation	Y	
h568	Retaining Wall	Dry laid Stone	Retaining wall is 5 feet long and 10 tall	Y	
h570	Retaining Wall	Dry laid Stone	Retaining wall is 4 feet long and 2 feet high	Y	
h574	Retaining Wall	Dry laid Stone	Retaining wall is 45 feet long and ranges from 2-10 feet tall	Y	
h578	Retaining Wall	Dry laid Stone	Great example of retaining wall. Wall is unusually long and ranges from 2-20 feet high.	Y	
h585	Retaining Wall	Dry laid Stone and Concrete	Retaining wall is 6 feet long and 4 feet high. Poor mortar/concrete repair on wall.	Y	
h586	Retaining Wall	Dry laid Stone	Retaining wall is 45 feet long and is up to 6 feet tall	Y	
h588	Retaining Wall	Dry laid Stone	Retaining wall is 45 feet long and 4 feet tall. Heavy vegetation covers the	Y	
h590	Retaining Wall	Dry laid Stone	Wall is unusually long and ranges from 3-12 feet tall	Y	

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h597	Retaining Wall	Dry laid Stone	Retaining wall measures as long as 80 feet and is obscured by heavy vegetation.	Y	
h600	Retaining Wall	Dry laid Stone	Retaining wall is 20 feet long and is up to 3 feet high	Y	
h606	Retaining Wall	Dry laid Stone	Retaining wall is 20 feet long and 6 feet high. Rough stacked wall constructed at 45 degree angle. Walls at this angle are extremely stable.	Y	
h609	Retaining Wall	Dry laid Stone	Retaining wall is 10 feet long and 3 feet tall	Y	
h610	Retaining Wall	Dry laid Stone	Retaining wall is 5 feet long and 3 feet tall	Y	
h613	Retaining Wall	Dry laid Stone	Retaining wall is 30 feet long and approximately 1 foot tall	Y	
h620	Retaining Wall	Dry laid Stone	Retaining wall is 10 feet long and 3 feet tall	Y	
h622	Retaining Wall	Dry laid Stone	Retaining wall is 20 feet long and 2 feet tall	Y	
h627	Retaining Wall	Dry laid Stone	Retaining wall is 15 feet long and 3 feet tall	Y	
h630	Retaining Wall	Dry laid Stone	Rubble wall is 20 feet long and 3 feet tall	Y	
h632	Retaining Wall	Dry laid Stone	Retaining wall is 5 feet long and 10 feet tall	Y	
h637	Retaining Wall	Dry laid Stone	Retaining wall is 10 feet long and 1 foot tall	Y	
h640	Retaining Wall	Dry laid Stone	20 feet long, 2 feet tall	Y	
h643	Retaining Wall	Dry laid Stone	Retaining wall is 30 feet long and 2 feet tall	Y	
h645	Retaining Wall	Dry laid Stone	Retaining wall is 10 feet long and 2 feet tall	Y	
h649	Retaining Wall	Dry laid Stone	Retaining wall is 50 feet long and up to 15 tall	Y	
h650	Retaining Wall	Dry laid Stone	Retaining wall is 30 feet long and 4 feet tall	Y	
h655	Retaining Wall	Dry laid Stone	Retaining wall is 30 feet long and up to 5 feet tall	Y	
h661	Retaining Wall	Dry laid Stone	Retaining wall is 15 feet long and 3 feet tall	Y	
h668	Retaining Wall	Dry laid Stone	Retaining wall is 25 feet long and 10 feet tall	Y	

Note: This table lists the GPS feature points on each trail. The ID_ column corresponds to the trail name abbreviation located at the end of this table.

Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h671	Retaining Wall	Dry laid Stone	Retaining wall is 30 feet long and 4 feet tall and is associated with a switchback. Pieces of the wall missing.	Y	
h674	Retaining Wall	Dry laid Stone	Retaining wall is 3-4 feet tall. There are a few minor gaps in the wall possibly due to rockslides.	Y	
h678	Retaining Wall	Dry laid Stone	Retaining wall is 10 feet tall	Y	
h679	Retaining Wall	Dry laid Stone	Wall is at 45 degree angle and moderately long.	Y	
h682a	Retaining Wall	Dry laid Stone	Retaining wall is 10 feet tall. Small gap in vertical wall from rockslide.	Y	
h686	Retaining Wall	Dry laid Stone	A vertical and 45 degree angle wall combined. Short gaps in wall, but almost continuous.	Y	
h690	Retaining Wall	Dry laid Stone	Retaining wall is 20 feet long and 10 feet high	Y	
h692	Retaining Wall	Dry laid Stone	Retaining wall is 5 feet long and 3 feet tall. Dense vegetation is covering the wall.	Y	
h696	Retaining Wall	Dry laid Stone	Retaining wall is 3-10 feet tall and moderately long	Y	
h701	Retaining Wall	Dry laid Stone	Retaining wall is 10 feet tall and moderately long	Y	
h703	Retaining Wall	Dry laid Stone	Retaining wall is up to 10 feet tall	Y	
h706	Retaining Wall	Dry laid Stone	Retaining wall 30 feet long and 3 feet tall	Y	
h714	Retaining Wall	Dry laid Stone	Retaining wall is 20 feet long and 2 feet tall	Y	
h717	Retaining Wall	Dry laid Stone	Retaining wall is 20 feet long and 1 foot tall. Wall is obscured by heavy	Y	
h718	Retaining Wall	Dry laid Stone	Retaining wall ranges from 4-10 feet tall	Y	
h731	Retaining Wall	Dry laid Stone	Retaining wall is 60 feet long and 2 feet high	Y	
h732	Retaining Wall	Dry laid Stone	Retaining wall is 3-4 feet tall. Dense vegetation is covering the wall.	Y	
h738	Retaining Wall	Dry laid Stone	Retaining wall is 3 feet tall	Y	
h748	Retaining Wall	Dry laid Stone		Y	

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h759	Retaining Wall	Dry laid Stone	Retaining wall is 5 feet long and 3 feet tall	Y	
h760	Retaining Wall	Dry laid Stone	Retaining wall is 10 feet tall. Portion of wall fell.	Y	
h765	Retaining Wall	Dry laid Stone	Retaining wall is 25 feet long and 6 feet tall	Y	
h771	Retaining Wall	Dry laid Stone	Retaining wall is 45 feet long and 3 feet tall. Wall is located on inside of trail.	Y	
h772	Retaining Wall	Dry laid Stone	Retaining wall is 35 feet long and 10 feet tall	Y	
h773	Retaining Wall	Dry laid Stone	Retaining wall is 60 feet long and ranges from 3-10 feet tall	Y	
h776	Retaining Wall	Dry laid Stone	Retaining wall is 3 feet tall. Dense vegetation is covering the wall.	Y	
h782	Retaining Wall	Dry laid Stone	Retaining wall is 6 feet tall and is damaged by rockslide.	Y	
h793	Retaining Wall	Dry laid Stone	Retaining wall is 25 feet long and 3 feet tall. Gaps in the wall from slides.	Y	
h797	Retaining Wall	Dry laid Stone	Retaining wall is 6 feet tall	Y	
h802	Retaining Wall	Dry laid Stone	Retaining wall is 15 feet long and 6 feet tall and is associated with switchback.	Y	
h804	Retaining Wall	Dry laid Stone	Retaining wall is 4 feet tall. Vegetation obscures portions of the	Y	
h814	Retaining Wall	Dry laid Stone	Retaining wall is 3 feet tall. Vegetation obscures portions of wall.	Y	
h822	Retaining Wall	Dry laid Stone	15 feet long, 2 feet tall	Y	
h826	Retaining Wall	Dry laid Stone	The retaining wall is as tall as 20 feet in some places and is 1.5 feet wide. Great example of a wall, although, historically it could have been a guard wall.	Y	
h829	Retaining Wall	Dry laid Stone	Retaining wall is 10 feet tall and 20 feet long	Y	
h831	Retaining Wall	Dry laid Stone	Retaining wall is 30 feet long and 5 feet tall	Y	

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h836	Retaining Wall	Dry laid Stone	Retaining wall is 3 feet tall. Note: wall lengths are approximate. Vegetation obscures portions that remain extant.	Y	
h844	Retaining Wall	Dry laid Stone	Retaining wall is 10 feet tall	Y	
h851	Retaining Wall	Dry laid Stone	Retaining wall is 20 feet long and 3 feet tall	Y	
h855	Retaining Wall	Dry laid Stone	Retaining wall is 25 feet long	Y	
h868	Retaining Wall	Dry laid Stone	Retaining wall/edging is 50 feet long and 3 feet tall	U	U
h869	Retaining Wall	Dry laid Stone	Retaining wall is 10 feet long	U	U
h876	Retaining Wall	Dry laid Stone	Retaining wall is 40 feet long and 5 feet tall	Y	
h893	Retaining Wall	Dry laid Stone	Retaining wall is 30 feet long, and 2 feet tall	U	Y
h928	Retaining Wall	Dry laid Stone	Retaining wall is 20 feet long and is associated with culvert on both sides of trail. Wall is at a 45 degree angle	U	U
h930	Retaining Wall	Dry laid Stone	Retaining wall is 15 feet long and 2 feet tall	U	U
h960	Retaining Wall	Dry laid Stone	Retaining wall is 15 feet long, 2 feet tall and is at a 45 degree angle.	U	Y
h964	Retaining Wall	Dry laid Stone	Retaining wall is 15 feet long and 1-2 feet high. The wall is rip rap-like	U	U
h969	Retaining Wall	Dry laid Stone	Retaining wall is 35 feet long and is at a 45 degree angle	Y	
k10	Retaining Wall	Dry laid Stone	40-foot long retaining wall. Portions of the wall are overgrown by vegetation	Y	
k101	Retaining Wall	Dry laid Stone	Rip rap retaining wall	Y	
k102	Retaining Wall	Dry laid Stone	Retaining wall 30 feet long, 1-2 feet tall	Y	
k106	Retaining Wall	Dry laid Stone	Retaining wall 40 feet long	Y	

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
k11	Retaining Wall	Dry laid Stone	20-foot long retaining wall, which is preventing trail erosion.	Y	
k13	Retaining Wall	Dry laid Stone	Short wall (20 feet long) on the uphill side of trail	Y	
k14	Retaining Wall	Dry laid Stone	Chunky, loose lava stones with a lot of vegetation. May be described later as rip rap retaining wall--wall is 12 feet long	Y	
k15	Retaining Wall	Dry laid Stone	20-foot long retaining wall. Trail adjacent to wall is 2 feet wide with crushed stone trail tread	Y	
k17	Retaining Wall	Dry laid Stone	Vegetation consuming 40-foot long wall. As a result of erosion, the trail	Y	
k2	Retaining Wall	Dry laid Stone	Retaining wall is approximately 15 feet long and located on down slope side of trail	Y	
k28	Retaining Wall	Dry laid Stone	Retaining wall is 15 feet long	Y	
k29	Retaining Wall	Dry laid Stone	Due to weak satellite GPS point was taken 30 feet beyond wall. Vegetation is obscuring wall, which is approximately 25 feet long	Y	
k3	Retaining Wall	Dry laid Stone	Retaining wall is approximately 15 feet long and is largely obscured by dense vegetation along trail	Y	
k30	Retaining Wall	Dry laid Stone	20-foot rip rap wall almost horizontal. General note: In some places wood roots serve to stabilize the trail and in some cases provide checksteps.	Y	
k31	Retaining Wall	Dry laid stone	Good example of a wall. Wall is 35 feet long and partly covered in vegetation	Y	
k32	Retaining Wall	Dry laid Stone	30-foot long rip rap retaining wall almost horizontal	Y	
k36	Retaining Wall	Dry laid Stone	15-foot wall partly hidden by vegetation. Cut and fill and rubble uphill	Y	
k38	Retaining Wall	Dry laid Stone	60-foot long wall intermittent on both sides of trail	Y	

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
k39	Retaining Wall	Dry laid Stone	Retaining wall 30 feet long	Y	
k4	Retaining Wall	Dry laid Stone	120-foot long retaining wall associated with switchback. Couldn't get point along second 40-foot switchback of the trail (from the bottom)	Y	
k40	Retaining Wall	Dry laid Stone	Retaining wall 40 feet long	Y	
k42	Retaining Wall	Dry laid Stone	Retaining wall 40 feet long	Y	
k43	Retaining Wall	Dry laid Stone	Retaining wall 50 feet long	Y	
k44	Retaining Wall	Dry laid Stone	Retaining wall 100 feet long	Y	
k45	Retaining Wall	Dry laid Stone	Retaining wall 30 feet long	Y	
k5	Retaining Wall	Dry laid Stone	20-foot long retaining wall is overgrown by vegetation. Wall was constructed using large chunky lava stones	Y	
k50	Retaining Wall	Dry laid Stone	Retaining wall is 20 feet long	Y	
k51	Retaining Wall	Dry laid Stone	Retaining wall is 20 feet long	Y	
k53	Retaining Wall	Dry laid Stone	Retaining wall is 30 feet long	Y	
k55	Retaining Wall	Dry laid Stone	Retaining wall is 25 feet long	Y	
k58	Retaining Wall	Dry laid Stone	Retaining wall is 50 feet long	Y	
k59	Retaining Wall	Dry laid Stone	Retaining wall is 20 feet long	Y	
k60	Retaining Wall	Dry laid Stone	Retaining wall is 30 feet long	Y	
k61	Retaining Wall	Dry laid Stone	Retaining wall is 60 feet long	Y	
k62	Retaining Wall	Dry laid Stone	Good example of 30-foot long retaining wall along gully. Sunken	Y	
k64	Retaining Wall	Dry laid Stone	Retaining wall is 30 feet long	Y	

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
k65	Retaining Wall	Dry laid Stone	300+ long rip rap retaining wall on both sides of trail. Cut/Fill. High-density of native raspberry in this area	Y	
k67	Retaining Wall	Dry laid Stone	Retaining wall 40 feet long and up to 10 feet high--great example, very linear wall	Y	
k68	Retaining Wall	Dry laid stone	Retaining wall is 30 feet long	Y	
k69	Retaining Wall	Dry laid stone	Retaining wall is 60 feet long	Y	
k70	Retaining Wall	Dry laid Stone	Retaining wall is 25 feet long	Y	
k71	Retaining Wall	Dry laid Stone	50-foot long rip rap retaining wall--last 20 feet has 1 foot high edging	Y	
k73	Retaining Wall	Dry laid Stone	Retaining wall is 20 feet long	Y	
k80	Retaining Wall	Dry laid Stone	Overgrown, uphill from wall--change in vegetation	Y	
k81	Retaining Wall	Dry laid Stone	Rough retaining wall and sunken trail	Y	
k82	Retaining Wall	Dry laid Stone	Vegetation obscuring 15-foot long wall	Y	
k83	Retaining Wall	Dry laid stone	Retaining wall is 20 feet long	Y	
k85	Retaining Wall	Dry laid Stone	Retaining wall is 20 feet long	Y	
k86	Retaining Wall	Dry laid Stone	constructed at 45 degree angle for stability	Y	
k87	Retaining Wall	Dry laid Stone	Vertical wall, 20 feet long	Y	
k88	Retaining Wall	Dry laid Stone	Vertical wall, 35 feet long	Y	
k89	Retaining Wall	Dry laid Stone	Retaining wall 60 feet long and 3 feet tall (short for this trail)	Y	
k9	Retaining Wall	Dry laid Stone	Chunky, loose stones piled on trail edge	Y	
k91	Retaining Wall	Dry laid Stone	Switchbackmiddle--20 feet long	Y	
k93	Retaining Wall	Dry laid Stone		Y	
k96	Retaining Wall	Dry laid Stone	Retaining wall 20 feet long	Y	

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
k97	Retaining Wall	Dry laid Stone	Retaining wall is 30 feet long	Y	
K52	Retaining Wall	Dry laid Stone	Retaining wall is 40 feet long	Y	
kda10	Retaining Wall	Stone	Wall may be associated withhold outhouse location in Kapalaoa Developed Area (Archy)	U	U
kda11	Retaining Wall	Wood	Located behind Kapalaoa Cabin	N	N
kda4	Structure	Dry laid Stone	Platform and retaining wall structure supports three water tanks on slope	Y	
kda5	Retaining Wall	Dry laid Stone	Supports wall in back of the three water tanks	U	U
s174	Retaining Wall	Dry laid Stone	The retaining wall is 20 feet long, 2 courses tall and is constructed primarily with small native lava stones	U	Y
s36	Retaining Wall	Dry laid Stone	Retaining wall measures 10 feet long--this is one of the few walls located on the trail	Y	
s60	Retaining Wall	Dry laid Stone		N	U
s70	Retaining Wall	Dry laid Stone	Located on uphill side of trail--non-historic	N	N
h1012	Rip Rap Trail Tread	Stone		U	U
h1033	Rip Rap Trail Tread	Stone	Rip rap trail tread is 8 feet long	U	U
h1043	Rip Rap Trail Tread	Stone	Rip rap trail tread is 8 feet long	U	U
h306	Rip Rap Trail Tread	Stone		U	U
h308	Rip Rap Trail Tread	Stone	Along this portion of trail integrity of features is unknown. Checksteps have been added, when in doubt declared undetermined. Cut trail tread more likely to be historic than rip rap. Checksteps in most cases, not historic.	U	U
h326	Rip Rap Trail Tread	Stone		U	U
h377	Rip Rap Trail Tread	Stone		U	U

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h381	Rip Rap Trail Tread	Stone	Erosion evident	U	U
h411	Rip Rap Trail Tread	Stone		U	U
h425	Rip Rap Trail Tread	Stone		U	U
h429	Rip Rap Trail Tread	Stone		U	U
h436	Rip Rap Trail Tread	Stone		U	U
h448	Rip Rap Trail Tread	Stone		U	U
h449	Rip Rap Trail Tread	Stone		U	U
h462	Rip Rap Trail Tread	Stone		U	U
h501	Rip Rap Trail Tread	Stone		U	U
h505	Rip Rap Trail Tread	Stone		U	U
h510	Rip Rap Trail Tread	Stone	Rip rap trail tread 10 feet long	U	U
h512	Rip Rap Trail Tread	Stone		U	U
h516	Rip Rap Trail Tread	Stone	Rip rap trail tread is 5 feet long	U	U
h523	Rip Rap Trail Tread	Stone	Rip rap tread is 10 feet long	U	U
h524	Rip Rap Trail Tread	Stone	Rip rap tread is 5 feet long	U	U
h526	Rip Rap Trail Tread	Stone	Impacts to trail tread: undercutting and erosion causing whole segments of tread to fall onto trail below.	U	U
h536	Rip Rap Trail Tread	Stone	Rip rap trail tread is 25 feet long	U	U
h542	Rip Rap Trail Tread	Stone	Rip rap trail tread is 40 feet long	U	U
h546	Rip Rap Trail Tread	Stone	Rip rap trail tread is 10 feet long	U	U
h548	Rip Rap Trail Tread	Stone	Rip rap trail tread is 15 feet long	U	U
h551	Rip Rap Trail Tread	Stone	Rip rap trail tread is 6 feet long	U	U

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h557	Rip Rap Trail Tread	Stone	Rip rap trail tread is 35 feet long	U	U
h564	Rip Rap Trail Tread	Stone		U	U
h565	Rip Rap Trail Tread	Stone		U	U
h567	Rip Rap Trail Tread	Stone	Erosion/undercutting is visible	U	U
h575	Rip Rap Trail Tread	Stone	Rip rap trail tread is 5 feet long	U	U
h580	Rip Rap Trail Tread	Stone	Rip rap trail tread is 30 feet long	U	U
h582	Rip Rap Trail Tread	Stone		U	U
h587	Rip Rap Trail Tread	Stone	Rip rap trail tread is 8 feet long	U	U
h589	Rip Rap Trail Tread	Stone	Rip rap trail tread is 10 feet long	U	U
h591	Rip Rap Trail Tread	Stone	Rip rap trail tread is 8 feet long	U	U
h595	Rip Rap Trail Tread	Stone	Rip rap trail tread is 20 feet long	U	U
h599	Rip Rap Trail Tread	Stone	Rip rap trail tread is 8 feet long	U	U
h607	Rip Rap Trail Tread	Stone	Rip rap trail tread is 3 feet long	U	U
h618	Rip Rap Trail Tread	Stone		U	U
h623	Rip Rap Trail Tread	Stone	Rip rap trail tread is 3 feet long	U	U
h626	Rip Rap Trail Tread	Stone	Rip rap trail tread is 10 feet long	U	U
h629	Rip Rap Trail Tread	Stone	Rip rap trail tread is 45 feet long. Trail is abraded for 10 feet.	U	U
h633	Rip Rap Trail Tread	Stone	Rip rap trail tread is 30 feet long--short gap in the tread	U	U
h639	Rip Rap Trail Tread	Stone		U	U
h641	Rip Rap Trail Tread	Stone	Rip rap trail tread is 5 feet long	U	U
h648	Rip Rap Trail Tread	Stone	Rip rap trail tread is 20 feet long	U	U
h653	Rip Rap Trail Tread	Stone	Rip rap trail tread is 30 feet long	U	U

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h669	Rip Rap Trail Tread	Stone		U	U
h672	Rip Rap Trail Tread	Stone		U	U
h694	Rip Rap Trail Tread	Stone	Rip rap trail tread is 40 feet long	U	U
h700	Rip Rap Trail Tread	Stone	Rip rap trail tread is 20 feet long	U	U
h708	Rip Rap Trail Tread	Stone		U	U
h715	Rip Rap Trail Tread	Stone		U	U
h719	Rip Rap Trail Tread	Stone	Rip rap trail tread is 40 feet long	U	U
h722	Rip Rap Trail Tread	Stone	Chunky stone rip rap	U	U
h726	Rip Rap Trail Tread	Stone	Rip rap trail tread is 10 feet long	U	U
h728	Rip Rap Trail Tread	Stone	Rip rap trail tread is 5 feet long	U	U
h740	Rip Rap Trail Tread	Stone	Rip rap trail tread is 20 feet long	U	U
h747	Rip Rap Trail Tread	Stone	Rip rap trail tread is 25 feet long	U	U
h752	Rip Rap Trail Tread	Stone		U	U
h756	Rip Rap Trail Tread	Stone	Rip rap trail tread is 10 feet long	U	U
h766	Rip Rap Trail Tread	Stone		U	U
h768	Rip Rap Trail Tread	Stone	Rip rap trail tread is 10 feet long	U	U
h770	Rip Rap Trail Tread	Stone	Rip rap trail tread is 30 feet long	U	U
h775	Rip Rap Trail Tread	Stone	Rip rap trail tread is 4 feet long	U	U
h778	Rip Rap Trail Tread	Stone		U	U
h787	Rip Rap Trail Tread	Stone	Rip rap trail tread is 20 feet long and is damaged by erosion	U	U
h788	Rip Rap Trail Tread	Stone	Rip rap trail tread is 5 feet long and is damaged by erosion	U	U

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h789	Rip Rap Trail Tread	Stone	Rip rap trail tread is 30 feet long and is damaged by erosion	U	U
h795	Rip Rap Trail Tread	Stone	Rip rap trail tread is 5 feet long	U	U
h801	Rip Rap Trail Tread	Stone	Rip rap trail tread is 7 feet long	U	U
h803	Rip Rap Trail Tread	Stone	Rip rap trail tread is 10 feet long	U	U
h806	Rip Rap Trail Tread	Stone	Rip rap trail tread is 40 feet long and is characterized by large, flat stones.	U	U
h817	Rip Rap Trail Tread	Stone		U	U
h819	Rip Rap Trail Tread	Stone	Rip rap trail tread is 5 feet long	U	U
h824	Rip Rap Trail Tread	Stone		U	U
h833	Rip Rap Trail Tread	Stone	Rip rap trail tread is 10 feet long	U	U
h842	Rip Rap Trail Tread	Stone	Rip rap trail tread is 30 feet long	U	U
h849	Rip Rap Trail Tread	Stone	Rip rap trail tread is 15 feet long--small gap between sections	U	U
h853	Rip Rap Trail Tread	Stone	Rip rap on Rainbow Bridge is 20 feet long	U	U
h857	Rip Rap Trail Tread	Stone	Rip rap trail tread is 40 feet long	U	U
h859	Rip Rap Trail Tread	Stone	Rip rap trail tread is 3 feet long	U	U
h862	Rip Rap Trail Tread	Stone	Rip rap trail tread is 3-4 feet wide. Note: wall lengths are approximate. Vegetation obscures portions that remain extant.	U	U
h881	Rip Rap Trail Tread	Stone	Rip rap almost continuous to the trailhead, except for a few gaps. Trail transitions to 2-foot dirt path for a short distance.	U	U
h886	Rip Rap Trail Tread	Stone	Smaller, angular stones, lighter color	U	U
h896	Rip Rap Trail Tread	Stone		U	U

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h905	Rip Rap Trail Tread	Stone	Smaller, angular stones, lighter color	U	U
h918	Rip Rap Trail Tread	Stone	Eroded away, 1/2 remains	U	U
h920	Rip Rap Trail Tread	Stone	Small, angular stones, lighter color	U	U
h924	Rip Rap Trail Tread	Stone	Rip rap trail tread is 6 feet long	U	U
h937	Rip Rap Trail Tread	Stone	Rip rap trail tread is 5 feet long	U	U
h952	Rip Rap Trail Tread	Stone	Rip rap trail tread is 10 feet long	U	U
h955	Rip Rap Trail Tread	Stone	Rip rap trail tread is 30 feet long and a few gaps are located in the middle of the tread.	U	U
h961	Rip Rap Trail Tread	Stone	Rip rap trail tread is 10 feet long	U	U
h975	Rip Rap Trail Tread	Stone	Rip rap trail tread is 15 feet long	U	U
h977	Rip Rap Trail Tread	Stone	Small gaps in middle of this section	U	U
h985	Rip Rap Trail Tread	Stone	Rip rap trail tread is 10 feet long	U	U
h991	Rip Rap Trail Tread	Stone	Rip rap trail tread is 15 feet long	U	U
h994	Rip Rap Trail Tread	Stone	Rip rap trail tread is 15 feet long and heavily eroded	U	U
h999	Rip Rap Trail Tread	Stone		U	U
hda11	Rip Rap Trail Tread	Stone		N	U
hda13	Rip Rap Trail Tread	Stone		U	U
hda15	Rip Rap Trail Tread	Stone		U	U
hda20	Rip Rap Trail Tread	Stone		U	U
hda22	Rip Rap Trail Tread	Stone		U	U
hda24	Rip Rap Trail Tread	Stone		U	U
hs23	Rip Rap Trail Tread	Stone		U	U

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
hs40	Rip Rap Trail Tread	Stone	Rip rap tread is 15 feet long	U	U
hs46	Rip Rap Trail Tread	Stone	Rip rap trail tread is 10 feet long--trail alignment is slightly different	U	U
hs56	Rip Rap Trail Tread	Stone	As a result of smooth lava flow (Pahoehoe) the trail alignment may be slightly different. The rip rap trail tread is 25 feet long	U	U
hs57	Rip Rap Trail Tread	Stone	15-foot long trail has few built features as it winds around the large volcanic feature.	U	U
s114	Rip Rap Trail Tread	Stone	Rip rap trial tread traverse through aa flow. Tread is approximately 13 feet long and 2-3 feet wide. Scattered scrub vegetation in locale.	U	U
s118	Rip Rap Trail Tread	Stone	Rip rap tread is 2-3 feet wide. Trail alignment becomes moderately curvilinear in this area	U	U
s123	Rip Rap Trail Tread	Stone	This segment of rip rap ends with a stone checkdam	U	U
s128	Rip Rap Trail Tread	Stone	Trail traverses aa flow	U	U
s131	Rip Rap Trail Tread	Stone		U	U
s135	Rip Rap Trail Tread	Stone		U	U
s139	Rip Rap Trail Tread	Stone	8 feet long, one point taken in middle	U	U
s141	Rip Rap Trail Tread	Stone		U	U
s144	Rip Rap Trail Tread	Stone	One point taken for rip rap section	U	U
s147	Rip Rap Trail Tread	Stone		U	U
s152	Rip Rap Trail Tread	Stone	One point taken for rip rap section	U	U
s157	Rip Rap Trail Tread	Stone	Intermittent rip rap	N	N
s168	Rip Rap Trail Tread	Stone	1 point taken	U	U

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Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
s170	Rip Rap Trail Tread	Stone	1 point taken (Along this trail, sections of rip rap that have only one point are less than 10 feet long. Please note that does not apply to all crater trails)	U	U
s19	Rip Rap Trail Tread		1 foot long	U	U
RY 2	RockCairn	Stacked Stone	4-foot cairn demarcates trail alignment. It is likely that the cairns predate CCC maintenance/construction activity on the trail.	N	Y
RY 3	RockCairn	Stacked Stone	3-foot tall cairn demarcates trail alignment	N	Y
RY 4	RockCairn	Stacked Stone	4-foot cairn demarcates trail alignment	N	Y
RY 5	RockCairn	Stacked Stone	4-foot tall cairn demarcates trail alignment	N	Y
BY 3	RockCut	Stone	Possible vertical cut. In other places, stones had simply been cleared to make a path.	U	Y
h320	RockCut	Stone		Y	
h336	RockCut	Stone		Y	
h418	RockCut	Stone		Y	
h423	RockCut	Stone	Rockcut approximately 20 feet long	Y	
k54	RockCut	Stone	Rockcut approximately 40 feet long. Probably blasted to make trail tread. Sheer rockface, vertical, below trail	Y	
k78	RockCut	Stone	Cut into rock creating wall on both sides	U	Y
s68	Sign	Metal	Interpretive sign	N	N
h504	Sign	Metal	Sign at gate on Halemau'u Trail	N	N
cc3	Social Trail		Junction with social trail	N	N
cc5 (?)	Social Trail		Verify GPS numbers here after. Junction with social trail leading to Kapalaoa	N	N
h1035	Social Trail		Near parking lot and trailhead	N	N
h206	Social Trail		Social trail leads toward pit near cone. Parts of trail have large stone tread. Trail remains 1-2 feet wide around cone	N	N

Note: This table lists the GPS feature points on each trail. The ID_ column corresponds to the trail name abbreviation located at the end of this table.

Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h313	Social Trail		Social trail located on the left (south) side of trail	N	N
h835	Social Trail		Trail off Halemau'u to view	N	N
h863	Social Trail		Junction with social trail	N	N
h866	Social Trail		Junction with social trail	N	N
h870	Social Trail		Junction with social trail	N	N
h873	Social Trail		Uphill side of trail	N	N
h883	Social Trail			N	N
h892	Social Trail		Off of the main path, shortcut	N	N
Hh6	Social Trail		Small segment of trail gullied by erosion	N	N
Hh7	Social Trail		Top of social trail	N	N
Hh8	Social Trail		Top of social trail #2 leading to CCC trail	N	N
s44	Social Trail		Social trail shortcut or between switchbacks	N	N
s48	Social Trail		Trail leading to view point	N	N
s63	Social Trail		Social trail to view	N	N
s102	Social Trail		Social trail is 2 feet wide	N	N
h466	Structure	Metal	Horse hitch located off Halemau'u Trail near gate to switchbacks	U	U
hda2	Structure	Metal	Horse Hitch, located near the Shed	N	U
hda27	Structure	Stone and Concrete	Water spigot in poor condition, not likely historic	N	N
hda28	Structure	Metal	Horse hitch located in front of cabin	U	U
hda3	Structure	Wood	Water tank located near the Shed	Y	
hda30	Structure	Wood	Shed located behind the cabin	N	N
hda31	Structure	Wood	Water tank located behind the cabin	Y	
hda32	Structure	Metal	Horse hitch located on side of cabin	U	U
hda33	Structure	Wood	Pit toilet located adjacent to cabin at least 50 feet away	N	N
hda34	Structure	Wood	Vacant, old outhouse, unused today.	N	N
hda4	Structure	Wood and Wire	Fence, located around the Shed and used as a horse pasture. Varying 3-4 strand, not barbed wire.	N	N

Note: This table lists the GPS feature points on each trail. The ID_ column corresponds to the trail name abbreviation located at the end of this table.

Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
hda5	Structure	Wood and Metal	Gate into pasture area	N	N
hda6	Structure	Fiberglass	Outhouse located between the Shed and the Wilderness camping area.	N	N
kda1	Structure	Wood	Water tank located on slope a short distance from cabin	Y	
kda12	Structure	Wood	Shed located behind cabin. Contemporary construction, same cladding as outhouse	N	N
kda13	Structure	Wood	Water tank located behind cabin	Y	
kda14	Structure	Metal	Horse hitch#2--located on west side of cabin	N	N
kda2	Structure	Wood	Water tank located on slope a short distance from cabin	Y	
kda3	Structure	Wood	Water tank located on slope a short distance from cabin--pipes extend from cabin to water tank	Y	
kda8	Structure	Metal	Horse hitch#1 located on east side of cabin	N	N
kda9	Structure	Wood	Outhouse--same material as shed, contemporary	N	N
pda1	Structure	Metal	Horse hitch	U	U
pda11	Structure	Wood	Water tank built by Coca	Y	
pda12	Structure	Wood	Water tank built in 1970s	N	Y
pda13	Structure	Fiber Glass	Contemporary flush vault toilet	N	N
pda3	Structure	Wood	Water tank located behind visitor cabin, built by CCC	Y	
pda4	Structure	Wood	Paliku Visitor Cabin pit toilet	N	N
pda5	Structure	Stone and Concrete	Water spigot of more recent construction, poor craftsmanship	N	N
pda8	Structure	Stone/Grass Covered	Foot bridge. Grass covered over stone. Bridge barely visible under dense vegetation.	Y	
pda9	Structure	Metal	Horse hitch	U	U
k12	Switchback	Stone	Stone wall retaining switchback	Y	
k41	Switchback			Y	
k48	Switchback			Y	
k90	Switchback	Stone	Retaining wall part of switchback--heavy vegetation	Y	
s61	Switchback	Stone		Y	
h28	Trail		Old and new alignments merge together--aa field adjacent	N	Y

Note: This table lists the GPS feature points on each trail. The ID_ column corresponds to the trail name abbreviation located at the end of this table.

Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h309	Trail		Silversword Loop--likely built in the 1960s and not documented as part of CLI	N	
kda6	Trail		Remnants of switchback trail alignment leading to water tanks.	U	Y
s105	Trail		Trail enters cinder field, and no permanent alignment is detectable. Alignment changes likely have occurred through time as a result of wind and water erosion. No vegetation. On average the trail measures 5-6 feet wide, but in places it is as wide as 17 feet.	Y	
s107	Trail		Major washout, approximately 50 feet of alignment altered	N	Y
cc4	Trail		To volcanic feature in the central crater	N	Y
pda7	Trail		Grass trail to Paliku Patrol Cabin--mown	Y	
BY 1	Trail Junction		Trail is 2-3 feet wide in most places, but can get up to 12 feet wide. It is characterized by few, if any built features. Slight alignment changes may have occurred through time, although it remains unknown.		
cc2	Trail Junction		Trail is 2-4 feet wide and has a sand/cinder tread		
cc6	Trail Junction		Possible junction withhold trail alignment		
h1	Trail Junction		Beginning of Halemau'u. Park staff reports that this section of trail has been heavily modified as a result of erosion. New alignments abound. Trail is slightly rutted and 2-3 feet wide. Trail tread is darks and/cinder		
h101	Trail Junction		Trail start from Left Y to Paliku less than 1 mile from h35		

Note: This table lists the GPS feature points on each trail. The ID_ column corresponds to the trail name abbreviation located at the end of this table.

Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
h201	Trail Junction		Trail is typically 2-3 feet wide, but as wide as 15 feet wide in some places. Trail has cinder/sand tread		
h30	Trail Junction		Trail junction withhold 1970s NPS trail. Large aa wall associated with cattle drives in crater		
h301	Trail Junction		Trail is 2-4 l some places and 6-8 feet wide in other places. Trail tread is sand/cinder		
h35	Trail Junction		Trail junction with Right Y. Trail transitions from aa flow to heavier scrub vegetation		
h401	Trail Junction		Short alternate alignment. Character of trail: 1-2 feet, cinder, grassland stone tread		
h910	Trail Junction		Trail junction with supply trail. Supply trail is 1-2 feet wide with a grass/dirt tread. From this point, approximately .7 of a mile to the trailhead		
Hh1	Trail Junction		Trail character 2-4 feet wide, sand/cinder trail tread. In some places it is as wide as 10 feet wide and very little distinguishing the trail as a trail. Trail traverses AA field for portions, which serves as trail base.		
hs1	Trail Junction		Beginning of documentation at the junction with Kaupo Trail. This trail is officially part of Halemau'u		
k1	Trail Junction		Located at the southern end of Kaupo Trail at the NPS boundary. Grass at the boundary very thick. Problem with thick grass, possible alignment changes--trail is 1 foot wide		
LY 1	Trail Junction		Recorded trail alignment associated with left side of Y		
PT 1	Trail Junction		Beginning of Paliku Trail at junction with Halemau'u		

Note: This table lists the GPS feature points on each trail. The ID_ column corresponds to the trail name abbreviation located at the end of this table.

Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
RY 1	Trail Junction		Trail junction of Right Y and Halemau'u. Character of trail: no obvious alignment in places, 1-2 feet wide, sections traverse tall grass, crushed cinder/sand as tread. Trail follows base of large topographic feature.		
s1	Trail Junction		Overall character of trail: straight alignment, at least 10 feet wide, sand/cinder base, average 4-12 feet wide. Trail is largely devoid of vegetation, small sections have scrub and silversword. Erosion problematic, gullies on downhill side of trail. In addition to sand, small stones are found on trail tread. Many of the checksteps and dams are clearly of modern construction. In some places the trail is as wide as 20+ feet!		
s101	Trail Junction		Trail junction of Sliding Sands and Horse Hitch Trail. Trail alignment in linear as it traverses east toward Kapalaoa Cabin. In this location, the trail is 7 feet wide.		
s38	Trail Junction		Junction with trail to Ka Lu' o ka O'o--non historic trail		
cc5	Trail Junction		Junction with established trail to Horse Hitch on Sliding Sands		
h202	Unmaintained Trail		Destination unknown--erosion evident	N	
h204	Unmaintained Trail		Unmaintained trail junction	N	
k57	Viewpoint		Koa Trees, gully ravine along trail looking towards Pacific Ocean	Y	
hda7	WildernesCamping Area		Visitor built rock walls to "enclose" camping space.	N	Y
pda6	WildernesCamping Area		Tall grasses, no clear demarcation of boundary	N	Y

Note: This table lists the GPS feature points on each trail. The ID_ column corresponds to the trail name abbreviation located at the end of this table.

Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
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Trail Name: Horse Hitch Trail

Unique ID Code: HH (1-9)

Start Location: Junction with Sliding Sands

End Location: Cinder Crater Trail and Short Cut Trail Leading to Kapalaoa

Inventory Date: July 22, 2008

Trail Name: Sliding Sands

Unique ID Code: SS (1-72)

Start Location: Horse Hitch Trail Junction with S.S.

End Location: Visitor Center Parking Lot

Inventory Date: July 20, 2008

Trail Name: Sliding Sands

Unique ID Code: SS (101-192)

Start Location: Junction with Horse Hitch

End Location: Junction with Halemau'u

Inventory Date: July 15, 2008

Trail Name: Kapalaoa Developed Area ("The Whale Tooth")

Unique ID Code: KDA (1-14)

Inventory Date: July 21, 2008

Trail Name: Paliku Trail

Unique ID Code: PT (1-11)

Start Location: Junction of Halemau'u Trail with Paliku Access Trail (.2 mile long)

End Location: Paliku Wilderness Campground

Inventory Date: July 17, 2008

Trail Name: Paliku Developed Area

Unique ID Code: PDA (1-13)

Inventory Date: July 17-18

Trail Name: Kaupo Trail

Unique ID Code: K (1-107)

Start Location: Haleakala Park Boundary in Kaupo Gap

End Location: Junction of Kaupo Trail with Halemau'u Trail

Inventory Date: July 16, 2008

Trail Name: Halemau'u Trail (Eastern extent of Halemau'u)

Unique ID Code: HS (1-58)

Start Location: Junction with Kaupo Trail

End Location: Junction with Sliding Sands

Note: This table lists the GPS feature points on each trail. The ID_ column corresponds to the trail name abbreviation located at the end of this table.

Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
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Inventory Date: July 17, 2008

Trail Name: Halemaw'u Trail

Unique ID Code: H (1-36)

Start Location: Junction of Halemaw'u and Sliding Sands Trail

End Location: Junction with Right Y

Inventory Date: July 17, 2008

Trail Name: Halemaw'u Trail

Unique ID Code: H (101-108)

Start Location: Junction of Left Side Y and Halemaw'u

End Location: Junction of Right Side of Y and Halemaw'u

Inventory Date: July 17, 2008

Trail Name: Right Y

Unique ID Code: RY (1-6)

Start Location: Junction with Right Y and Halemaw'u

End Location: Junction with Left Y and Base

Inventory Date: July 17, 2008

Trail Name: Base of Y

Unique ID Code: BY (1-3)

Start Location: Sliding Sands Junction with Y

End Location: Junction of L/R of Y

Inventory Date: July 21, 2008

Trail Name: Base of Y

Unique ID Code: BY (1-3)

Start Location: Sliding Sands Junction with Y

End Location: Junction of L/R of Y

Inventory Date: July 21, 2008

Trail Name: Halemaw'u Trail

Unique ID Code: H (201-207)

Start Location: Junction with Left Y

End Location: NW Corner of Loop around Crater

Inventory Date: July 21, 2008

Trail Name: Left Y

Unique ID Code: LY (1-2)

Start Location: Trail Junction with Right Y and Base of Y

End Location: Junction with Halemaw'u

Note: This table lists the GPS feature points on each trail. The ID_ column corresponds to the trail name abbreviation located at the end of this table.

Trail System Features

CLI

ID_	Structure Type	Material	Notes and Photo Log	Historic Y/N/U	Compat. Y/N/U
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Inventory Date: July 17, 2008

Trail Name: Halemau'u Trail

Unique ID Code: H (301-382)

Start Location: Junction with Cinder Cone Trail

End Location: Holua Cabin

Inventory Date: July 22, 2008

Trail Name: Short Cut from Cinder Cone to Kapalaoa

Unique ID Code: CC KC (1)

Start Location: Off Cinder Cone Trail

End Location: Junction with Sliding Sands

Inventory Date: July 21, 2008

Trail Name: Cinder Cone Trail Loop

Unique ID Code: CC (1-7)

Start Location: Junction with Halemau'u Northwest Corner

End Location: Northeast Corner of Halemau'u

Inventory Date: July 21, 2008

Trail Name: Halemau'u

Unique ID Code: H (401-467)

Start Location: Holua Cabin

End Location: Halemau'u Gate Below Switchbacks

Inventory Date: July 22, 2008

Trail Name: Halemau'u

Unique ID Code: H (501-1051)

Start Location: Halemau'u Gate at Base of Switchbacks

End Location: Trailhead Parking Area

Inventory Date: July 23-24, 2008

Trail Name: Holua Developed Area

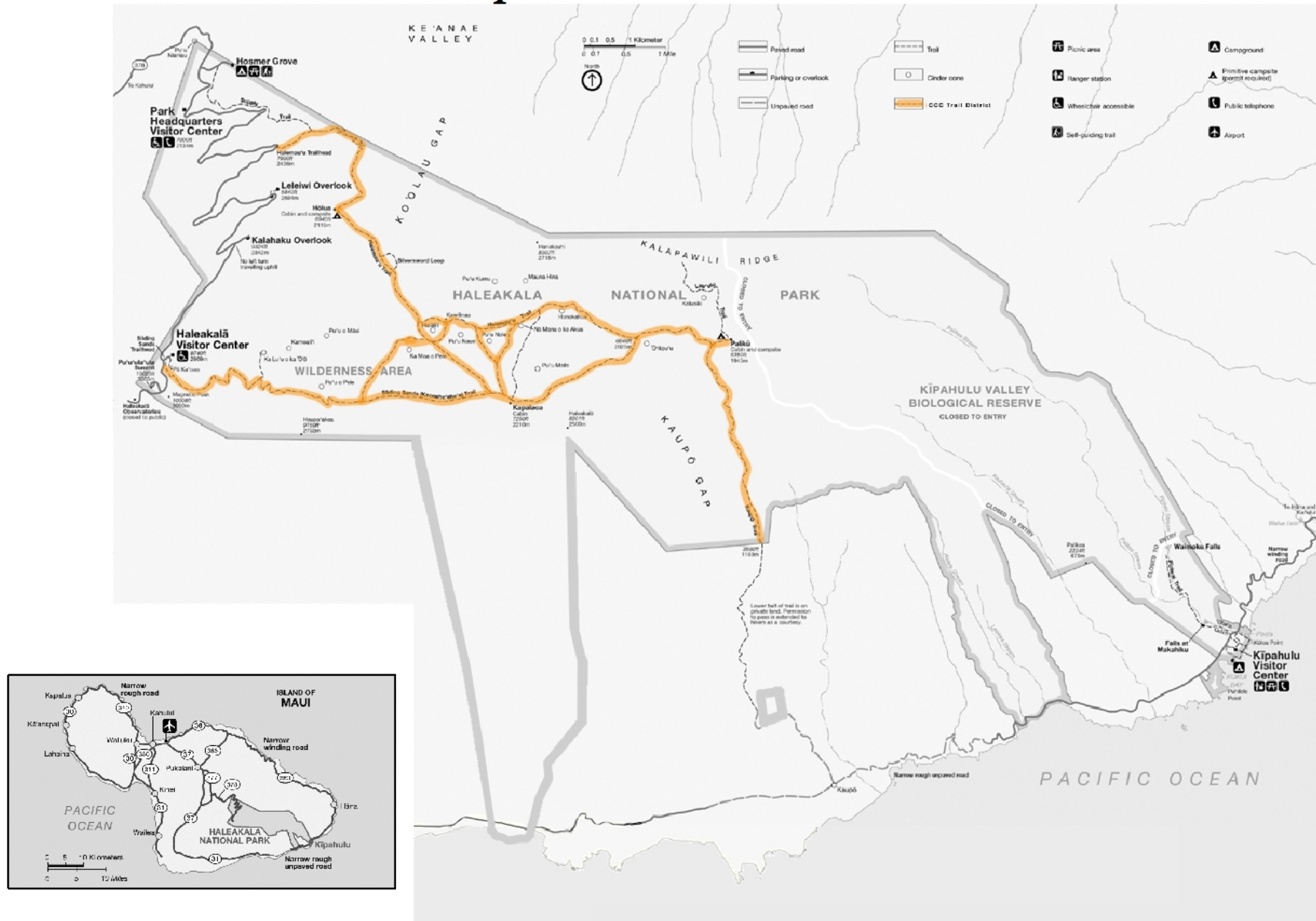
Unique ID Code: HDA (1-34)

Inventory Date: July 23, 2008

Note: This table lists the GPS feature points on each trail. The ID_ column corresponds to the trail name abbreviation located at the end of this table.



Civilian Conservation Corps Haleakala Crater Trails District: Location Map

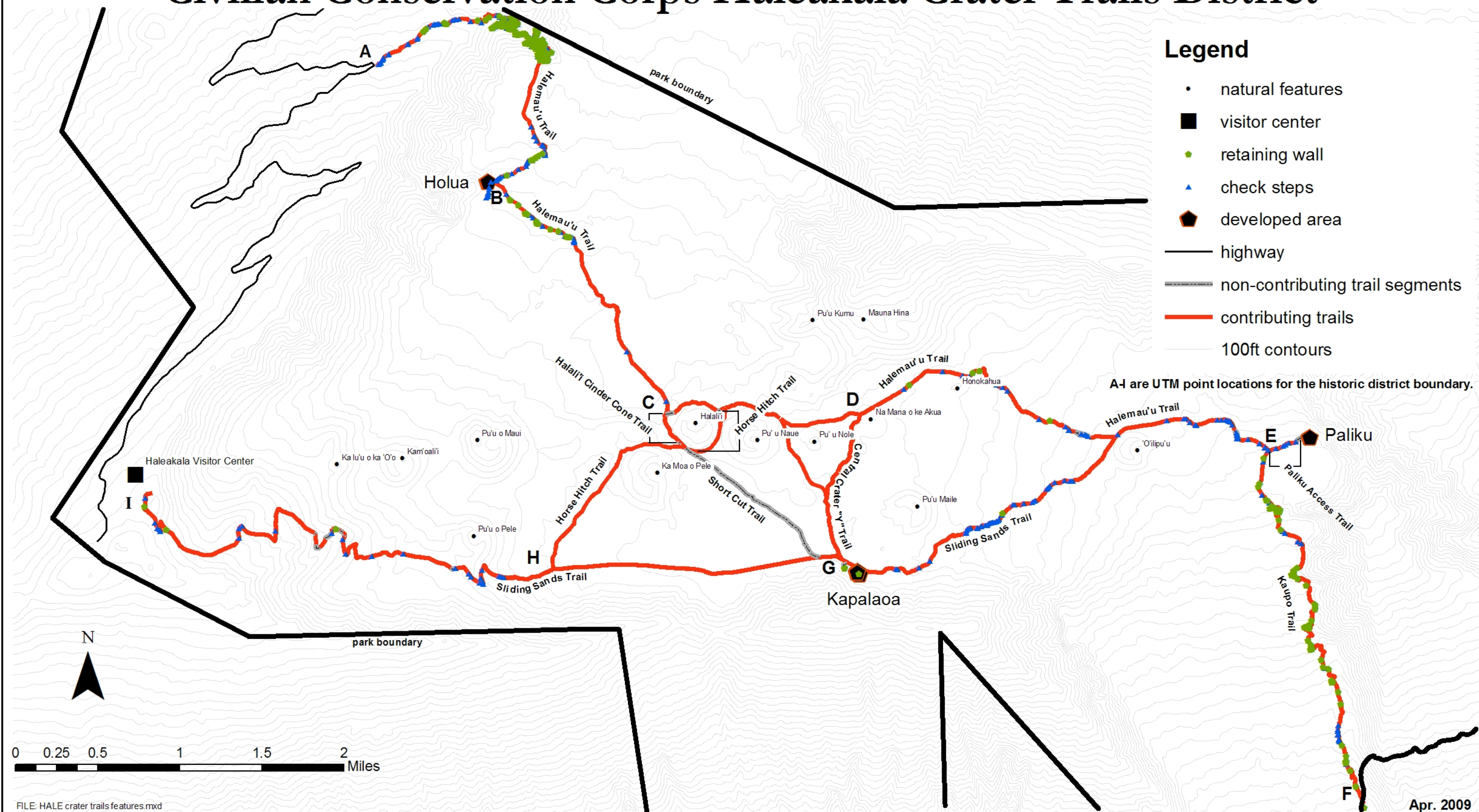


Source: NPS park maps

Apr. 2009
Produced by PWRO Cultural Resources



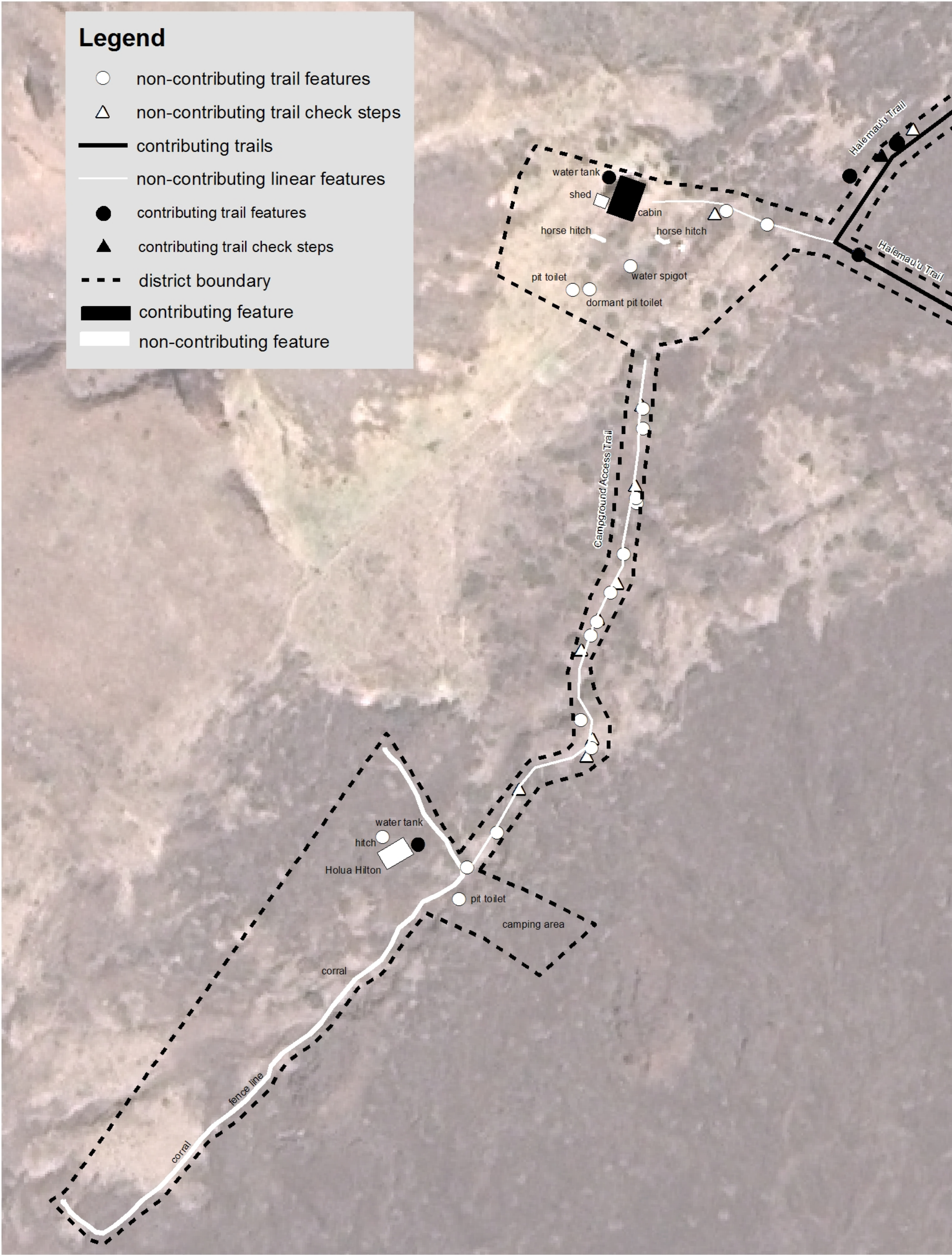
Civilian Conservation Corps Haleakala Crater Trails District





Cilivian Conservation Corps Haleakala Crater Trails District

Holua Cabin Developed Area



Legend

- non-contributing trail features
- △ non-contributing trail check steps
- contributing trails
- non-contributing linear features
- contributing trail features
- ▲ contributing trail check steps
- - - district boundary
- contributing feature
- non-contributing feature



Civilian Conservation Corps Haleakala Crater Trails District



Legend

- contributing trails
- non-contributing trails
- - - district boundary
- contributing feature
- non-contributing feature

Source: 2005 aerial from NPS GIS data. Feature data collected in July 2008 by PWRO Cultural Resources.

District boundary includes 10 feet on both sides of trail.

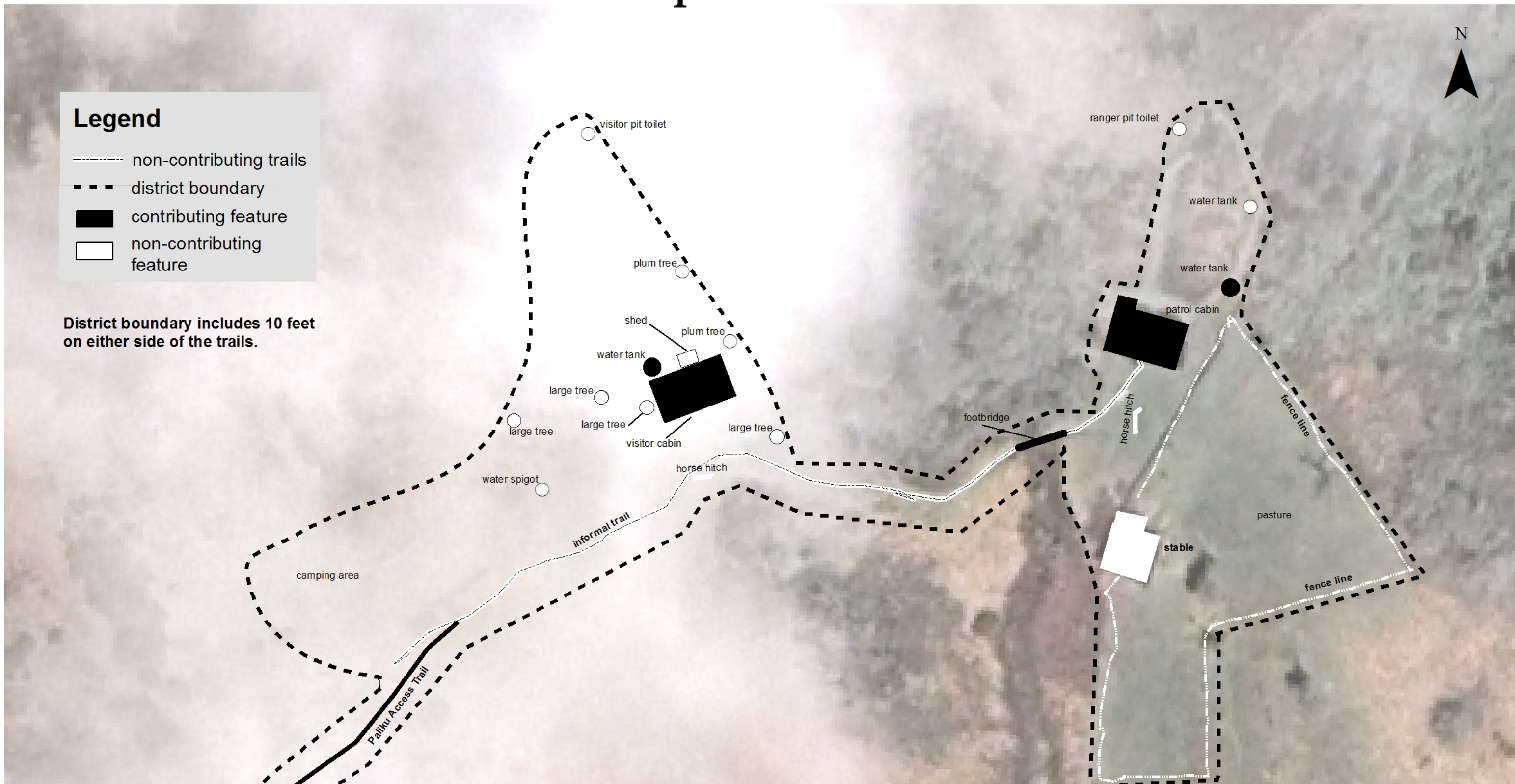
Kapalaoa Cabin Developed Area

Apr. 2009

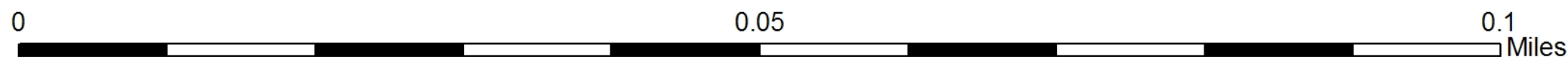
Produced by PWRO Cultural Resources



Civilian Conservation Corps Haleakala Crater Trails District



Source: 2005 aerial from NPS GIS data. Feature data collected in July 2008 by PWRO Cultural Resources.



Paliku Cabin Developed Area

Produced by PWRO Cultural Resources

Apr. 2009