

placed on existing terrain (undulating). The west wing of the house has a concrete floor on grade, although located about three feet above the garage and water tank storage area. It is not clear whether the west wing area was naturally flat or whether grading or filling took place prior to construction. The overall amount of topographic manipulation for the house's construction appears to have been relatively minor.

The undulating lava rock substrate characteristic of the area would have required some degree of grading for road construction. The current condition of the driveway suggests that the level of grading was not substantial. Also, the prevalence of rock outcrops in near proximity of the ranch house suggests that natural topography was predominantly left intact.

AESTHETIC DESIGN

Within the landscape, topography is also integrated into the informal site design. It appears that Shipman sought to integrate or even emphasize natural topography with planted vegetation. For example, the long hedgerow of dracaena follows the contour on the topside of a natural escarpment ranging from four to six feet tall. This hedgerow merges into boxwood and arborvitae as the rocky escarpment fades into a rounded hill. The dwarf date palms that line the driveway loop on the eastern side of the house separate the driveway from a steep drop in the natural terrain. In addition, several irregularly shaped lava outcrops in the southern and western lawn areas still bear plants that remain from the period of significance, both native and introduced. These decorated outcrops are visually defining features in the landscape design (see photo, Topography # 2).

Since 'Ainahou Ranch is a geologically infantile area that lacks naturally occurring soil deposits of any significant depth, it can only be assumed that soil was brought in for landscaping purposes. Early photographs from the period of significance suggest that much of the contemporary lawn area, even in the lower lying areas, was characterized by exposed bedrock. During the period of significance, much of the areas designated as the southern and western lawn today were formerly planted with flowers. No mounds of soil indicating former garden beds are visible in these areas, so it is possible that imported soil that was not enclosed or terraced using rock walls was eventually strewn about the lawn area by forces of erosion, filling small cracks and depressions that may have been visible during the period of significance.

SUMMARY

Topography was influential in the development of several different aspects of the component landscape and has not been significantly altered following the period of significance. Therefore, this characteristic contributes to the significance of the 'Ainahou Ranch House and Gardens.



Topography # 1: In Shipman's gravity-powered water system, this water tank a few feet down from the nursery area collected water from the roofs of the hothouses, and serviced the livestock facilities down slope (PWR, HAVO, CLI files, 2003).



Topography # 2: Lava outcrops are topographic features that contribute to the character of the landscape (PWR, HAVO, CLI files, 2003).

Buildings And Structures

For purposes of the CLI, buildings are defined as elements primarily built for sheltering any form of human activity, whereas structures are functional elements constructed for purposes other than sheltering human activity. The CLI references the List of Classified Structures (LCS) and records buildings and structures as features of the landscape. The LCS Program is the National Park Service's inventory for buildings and structures. It provides details that are not typically found in the CLI and should be referenced for more definitive structure information.

The 'Ainahou Ranch House and Gardens contains buildings and structures built by Herbert Shipman. They reflect his need for a mountain retreat in case of a Japanese invasion, a personal retreat for friends and family, and a place to raise his flock of Nene (Hawaiian endangered goose). The buildings and structures associated with Shipman are: the ranch house, the lua (comfort station), several sheds, the water catchment system, and stone walls. Since the end of the revised period of significance (1971), the NPS has installed several structures associated with monitoring the environment at the 'Ainahou Ranch House such as a weather station, a rain gauge, and solar panels with a generator to supply the kitchen and other parts of the house with electricity. The park has also built a greenhouse, potting benches, a grape trellis and a work area on the historical location of Shipman's greenhouses.

CONTRIBUTING

'AINAHOU RANCH HOUSE AND ASSOCIATED FEATURES

Construction of the 'Ainahou Ranch House began in 1940 and ended in July of the following year (Durst, 2001). Shipman took part in the design of the ranch house; however the original architect is unknown. The draftsman for the ranch house was Mr. Kansaku (Suzuki/Morgan Architects, LTD, 2003).

The ranch house is an example of Craftsman style in Hawai'i. It is a two story, rough sawn redwood building. The first floor layout consists of a living room, bathroom, kitchen, dining room, bunkhouse, saleroom, a water tank storage room and a covered lanai in front of the kitchen and a two car garage (see photo, Buildings and Structures # 1). The second floor layout consists of a master bedroom and master bathroom (with closet), a guest suite and guest bathroom (with closet), and a covered balcony stretching from the guest room to the master bedroom (see photo, Buildings and Structures # 2). The front façade of the house is south facing with a semi-open view to the ocean and garden from the balcony.

Two small metal water tanks once used for drinking water are nestled in on the east side of the house (see photo, Buildings and Structures # 3). The roof of the ranch house served as the rain shed for these two tanks, which were not issued separate LCS numbers due to their close association with the ranch house. The two large water storage tanks that were contained within the ranch house building are no longer present, but their concrete foundations are still intact. These foundations are also considered part of the ranch house and therefore do not have separate LCS numbers.

'AINAHOU RANCH LUA (Pit Toilet)

The lua (pit toilet) was built (date of construction is unknown) just north of the house for workers and ranch hands. The 12' x 6' structure is built of wood board and batten and contains two rooms. The metal corrugated roof covers one room with a two-hole seat and the other room with a one-hole seat. The foundation is made of stone masonry. A new corrugated roof and gutter was replaced in 1997.

'AINAHOU RANCH SHED # 1

Shed #1, also known as the jeep shed is located north of the nursery area. This 20' x 16' wood framed structure has corrugated walls on the north and east side and is open on the south and west sides. The

metal corrugated roof is held up by seven 'ohi'a posts. The construction date is unknown. The roof was replaced in 1997.

'AINAHOU RANCH SHED # 2

Shed #2, also known as the potting shed is a 12' x 20' wood board and batten shed with only its south side open. This shed is located adjacent to the nursery area. The corrugated metal roof sits on the truss roof framing. The eight supporting 'ohi'a posts lack diagonal bracing. The date of construction is unknown. The new roof, a new gutter at the rear, and new siding on the east were replaced in 1997.

'AINAHOU RANCH GREEN HOUSE RUIN

This feature has been identified as the foundation for a small water tank associated with Shipman's greenhouse (Zimmer, personal comm., 2003).

'AINAHOU RANCH ROCK WORK

The stone walls at the 'Ainahou Ranch House were built during the period of significance, after the construction of the ranch house (exact dates are unknown except for the seat wall by the driveway dating to April, 1941). These walls are either dry stacked or mortared (mosaic pattern). The masonry stone walls are constructed of local lava rock (Suzuki/Morgan Architects, LTD, 2003). The stone walls are located immediately outside of the ranch house, within the garden, and near the NPS greenhouse. The stonework at the ranch house consists of dry stacked planter beds, lava rock walkway, lava rock serpentine wall, lava rock patio/driveway, lava rock seat wall, dry stacked rock walls and mortared lava rock walls (see buildings and structures map in appendix).

Lava Rock Serpentine Walls

A free-standing, lava rock serpentine wall starts outside of the living room and meanders into the garden. The wall is made of local lava rock set in mortar. Across from this wall is another serpentine wall which constitutes the northern portion of a large planter bed. Between the two symmetrical serpentine walls, is a formal lava rock walkway (peanut-shaped) that includes a circular opening in the center of its widest pass, from which a camellia plant is growing (see photo, Buildings and Structures # 4). The height of the wall ranges from 8" to 16" and the width ranges from 10" to 16".

Planter Beds

Two small, mortared rock planter beds sit just outside of the living room. A large planter bed framed by a serpentine wall, a dry-laid rock wall, and the barbecue pit is located just south of the small planter beds. This feature has an irregular shape and ranges from 1'3" to 2'3" in height and is the largest enclosed planter bed on the grounds. There are also several dry-laid rock planter beds immediately to the east and west of the ranch house. These features are generally one to two rock layers high and less formal in appearance than the planter beds to the south of the house (see Buildings and Structures map in Appendix).

Lava Rock Patio/Driveway/Barbecue Pit

The lava rock patio/driveway is located on the south side of the house to access to the two car garage and provide an open patio space for grilling. The dimensions of this patio/driveway are 25' 4" x 22' 4". The barbecue pit is 12' 6" long and 3' wide. An 8' long, 3' wide wall extends from the barbecue pit towards the house (see photo, Buildings and Structures # 5).

Lava Rock Wall

A separate lava rock wall framing the other side of the patio/driveway area bears a date inscription "4-7-41". The masonry seat wall is built with local lava rock and extends the length of the patio/driveway. The wall is 1'6" high by 1'5" wide. At the bottom of the wall facing the driveway is a 5" high by 11" wide

curb made of local lava rock.

Lava Rock Stairs and Walkway

The area behind the dining room near the two small metal water tanks includes mortared lava rock stairs (3'11" deep with a 7" rise) leading to a lava stone paved walkway that provides access to the dining room, the two metal water tanks, the bunkhouse, and the salt room. The paved walkway continues to the salt room and the northeast corner of the house. Just east of the sidewalk is a mortared lava rock stone wall that runs from the stairway and extends for 29' north delineating the garden bed adjacent to the east side of the ranch house. The wall is 18" high and 5" wide for the first 15'4" and 1" wide for the remaining 13'8". A dry-laid retaining wall extends from the south corner of the stairway to the seat wall by the driveway. The height and width of this wall varies from 8" to 11" in height and 1' to 18" in width.

Nursery Dry-laid Rock Walls

Two stretches of a dry-laid retaining wall run from the nursery area towards the ranch house (see Buildings and Structures map in Appendix). The first stretch of the retaining wall is 24' long and 1' wide. The height of the wall ranges from 6" to 16". The second stretch of wall (the one that is closer to the ranch house) runs 49' long and has the same width and height as the first wall (see photo, Buildings and Structures # 6). Although the construction date of these walls is unknown, they should be considered to be contributing features until further research can be completed.

Nursery Planter Beds

Just south of the retaining walls are four dry-laid rock planter beds from which roses were grown during the period of significance. These planter beds range in diameter and are only one rock layer (about 6") high. A few stones appear to be missing from the planter beds. Although the construction date of these walls is unknown, they should be considered to be contributing features until further research can be completed.

'AINAHOU RANCH GENERATOR SHED FOUNDATION

The mortared stone foundation of Shipman's generator shed remains approximately seventy feet east of the ranch house (at the bottom of the hill). The dimensions are approximately 10' x 20' x 2'6" high. Remains of an old generator can still be seen within the structure. The wooden portions of the structure are now missing.

'AINAHOU RANCH WATER SYSTEM

'Ainahou Ranch Water Tank

This redwood water tank is 14' high and 20' in diameter and is located just east of the ranch house and can support 33,000 gallons of water (Suzuki/Morgan Architects, LTD, 2003). This tank is placed on concrete piers. Steel girts support the redwood water tank. The corrugated metal roof sits above the water tank and is supported by four 'ohi'a posts with diagonal 'ohi'a side braces. New roofing for was completed for this water tank in 1993.

'Ainahou Ranch Water Tank

This redwood water tank is located just south of the nursery area. This redwood water tank holds 13,300 gallons water and is 7' high and 18' in diameter. The tank is placed on pier foundations made with concrete and stone. Four 'ohi'a posts support the metal corrugated roof which was replaced around 1993 (Suzuki/Morgan Architects, LTD, 2003). Several 'ohi'a posts were placed as diagonal lateral bracing for the roof. Eight steel girts support the redwood water tank. Four metal valves are located on the south east side of the tank.

Other Water Tanks

The two small, metal water tanks nestled in on the east side of the ranch house are considered part of the ranch house entry. Another metal tank (#11 on the Water System maps in Appendix) appears to have been an overflow tank for the 33,000 gallon water tank listed above. The tank is rusted through and is currently leaning rather severely.

Unidentified Metal Containers

The functions of three other rusted metal containers in the vicinity of the 33,000 gallon redwood tank and the generator shed foundation are poorly understood. It is possible that they may have been associated with water storage before the water system was fully developed. It is also possible that they may have contained fuel for the generator or even grain for Shipman's livestock. One tank is rectangular, containing cross-bars within (see photo, Buildings and Structures # 7). Another feature is short and cylindrical with a removable lid (see photo, Buildings and Structures # 8). The last feature is rusted beyond recognition, but has apparently fallen off of a small, mortared rock foundation bearing the inscription "Peter" with an illegible date (probably 1941). These features should be considered contributing until more research regarding their functions can be completed.

Stone Water Tank Foundation

The large water tank foundation located approximately eighty feet NNW of the ranch house is a prominent remnant structural feature in the component landscape. The foundation consists of a rectangular stone retaining wall around the perimeter, within which several linear support walls and triangular foundations at either end are contained. The foundation design appears to have enabled a maintenance worker to crawl below the 37,000 gallon cylindrical tank to inspect or service leaks. According to historic photographs, the water tank that was mounted on this foundation had a gabled roof structure supported by 'ohi'a posts. In comparison with the other tanks remaining in the landscape, this tank-housing structure had the most formal appearance, probably due to its close proximity to the ranch house. In the summer of 2004 a new water tank was mounted on this foundation to rehabilitate the historical feature.

Other Water Tank Foundations

It is possible that there are other water tank foundations in the component landscape that remain obscured by vegetation. The foundations for water tanks numbered 12, 14, and 16 on the Water System maps (see Appendix) have not been located and in fact their locations on the maps are approximated from old water system drawings. The LCS entry entitled "'Ainahou Ranch Greenhouse Ruin" was positively identified as the foundation for a small water tank (# 13 on Water System maps) associated with the Shipman's greenhouse (Zimmer, personal comm., 2003).

Pipes and Valves

The 'Ainahou Ranch Water System was extensive and complex, and once included twenty or more interconnected tanks from the main rain shed tanks to the lower reaches of the parent landscape. While several tanks remain, many are also missing, and the vast network of pipe lines and valves is largely obscured by vegetation and/or soil. The locations of pipes and valves on the Water System maps (see Appendix) of this report are extrapolated from G. Clarke's schematic representation (1978) and the locations of visible pipe segments and a few remaining valves.

NON-CONTRIBUTING

Structures built by the NPS include a weather station to monitor temperature and humidity on the site, a solar panel/generator to supply power to the ranch house kitchen, and a rain gauge to monitor rainfall. These features are located just to the north west of the ranch house. The NPS has also established a nursery area in the same location as Shipman's glass hot houses. The NPS nursery area consists of a

(temporary) covered potting area, a fenced-in area with potting tables (open-air nursery), and a small plastic greenhouse. NPS volunteers also built a grape trellis near the plastic greenhouse replacing the historical trellis that was removed.

The NPS solar panel and generator was installed just north of the ranch house in 1998 by HELCO (Hawai'i Electric and Light Company) and NPS staff. The solar panel and generator, a donation by HELCO was intended to demonstrate the ability of solar power in a remote location such as 'Ainahou Ranch House. The solar power supplies energy to the ranch house's refrigerator, kitchen lights, and garage/storage area.

The weather station was installed in 1999 by the NPS to monitor the weather at the 'Ainahou Ranch House for fire management purposes (Ricketts, 2003).

The rain gauge was installed in 1999 by NPS staff to monitor rainfall. Originally Shipman had three rain gauges (two near the ranch house and one near the rain sheds), however the original locations of these rain gauges is unknown.

The NPS nursery area was first used by the park in 1973 to propagate native plants for re-vegetation projects at the park (Zimmer, 2003). The park utilized the same area in which Shipman had his greenhouses, and established wooden potting benches (open air nursery), temporary covered work stations, and a new greenhouse which is considerably smaller than the historical greenhouse that was removed. Today the nursery area is still used by the park to propagate native plants. The grape trellis adjacent to the nursery area was added by volunteers in 2002, but there was a historic-period trellis of similar size in this approximate location. NPS staff uses Shed # 2 to store nursery supplies and equipment.

SUMMARY

Although some changes to the buildings and structures have occurred due to neglect, removal, and the addition of non-contributing features, the majority of the historic structures remain as they were during the period of significance. Perhaps most importantly, the ranch house and surrounding hardscape and walls are intact in their original configurations, creating the same focal point of the landscape that Shipman intended. Following the period of significance the NPS installed a weather station, solar panel and generator, a rain gauge, a greenhouse, and a grape trellis, all of which are non-contributing to the historic scene. Although these structures were added at a later time, they do not compromise the overall character of the ranch house and grounds. As a result, buildings and structures is a contributing characteristic of the 'Ainahou Ranch House and Gardens.



Buildings and Structures # 1: Contemporary photo of the front view of the 'Ainahou Ranch House (PWR, HAVO, CLI files, 2003).



Buildings and Structures # 2: Contemporary photo of the grape trellis located on the south side of the ranch house (PWR, HAVO, CLI files, 2003).



Buildings and Structures # 3: Contemporary photo of the east side of the ranch house (looking SW)(PWR, HAVO, CLI files, 2003).



Buildings and Structures # 4: Contemporary photo of the serpentine rock wall framing the outdoor patio area (PWR, HAVO, CLI files, 2003).



Buildings and Structures # 5: Contemporary photo of the barbecue pits built with lava rocks in a mosaic pattern (PWR, HAVO, CLI files, 2003).



Buildings and Structures # 6: A dry-laid lava rock retaining wall located between the nursery area and the ranch house (PWR, HAVO, CLI files, 2003).



Buildings and Structures # 7: A rusty metal container near the generator shed foundation. Historical function unknown (PWR, HAVO, CLI files, 2003).



Buildings and Structures # 8: A rusty metal container w/ lid near the generator shed foundation. Historical function unknown (PWR, HAVO, CLI files, 2003).

Characteristic Feature	Type Of Contribution	LCS Structure Name	IDLCS Number	Structure Number
'Ainahou Ranch Generator Shed Foundation	Contributing	Ainahou Ranch Generator Shed Foundation	058288	B320M
'Ainahou Ranch Greenhouse Ruin	Contributing	Ainahou Ranch Greenhouse Ruin	058279	B320D
'Ainahou Ranch House	Contributing	Ainahou Ranch House	058275	B320
'Ainahou Ranch Lua (pit toilet)	Contributing	Ainahou Ranch Lua	058276	B320A
'Ainahou Ranch Rock Work	Contributing			
'Ainahou Ranch Shed # 1	Contributing	Ainahou Ranch Shed No.1	058277	B320B
'Ainahou Ranch Shed # 2	Contributing	Ainahou Ranch Shed No. 2	058278	B320C
'Ainahou Ranch Stone Walkways	Contributing			
'Ainahou Ranch Stone Walls	Contributing	Ainahou Ranch Stone Walls	058285	B320J
'Ainahou Ranch Water System	Contributing			
'Ainahou Ranch Water Tank	Contributing	Ainahou Ranch Water Tank	058280	B320E
'Ainahou Ranch Water Tank (2)	Contributing	Ainahou Ranch Water Tank	058282	B320G
'Ainahou Ranch Water Tank Foundation	Contributing	Ainahou Ranch Water Tank Foundation	058281	B320F
Grape trellis	Non-Contributing			
NPS Greenhouse	Non-Contributing			
NPS rain gauge	Non-Contributing			
Solar panel and generator	Non-Contributing			
Weather station	Non-Contributing			

Cluster Arrangement

The cluster arrangement of a landscape refers to the location and patterns of buildings, structures, and associated spaces.

Buildings and structures within the component landscape are grouped in two clusters, one is residential, and the other is nursery related. The residential cluster includes the ranch house, lua (pit toilets), and nearby water tanks. The nursery cluster includes shed # 1, shed # 2, the nursery area, greenhouse, and nearby water tanks.

Residential Cluster

Three of the eight known water tanks in the ranch house cluster have been removed (see water system maps in Appendix). While the ranch house cluster constituted the first major delivery point in the water system, it also constituted the second major collection point. During Shipman's tenure there were several large water storage tanks in close proximity to the ranch house, including two 24,000 gallon water tanks that were located within the residential structure in a large, central room built specifically for water storage (see Water System map, Enlargement C, in Appendix). There was a utilitarian function for placing so many water tanks in close proximity to the house. If Shipman had distanced them (placed them further down slope) to make them less conspicuous, then they would not have been sufficiently elevated to service the nursery area. The two small metal tanks to the east of the house held water for human consumption collected from a portion of the house's roof, which could be kept clean more easily than the sum of all rain-catching surfaces in the broader water system. The arrangement of these two tanks, tucked in on the eastern porch, allowed three overhead pipes to fill them without causing an eyesore in the landscape.

The lua is also associated with the residential cluster, located downwind from the house at a respectable distance. Flushable toilets were available inside the house for Shipman himself and presumably for his esteemed guests. The lua was probably included in this cluster to accommodate Shipman's employees that often stayed overnight in the bunkroom at the ranch house (see Buildings and Structures map in Appendix).

Nursery Area Cluster

The nursery area cluster consists of shed # 1, shed # 2, the nursery area, greenhouse, and nearby water tanks. Although the greenhouse has been replaced with a smaller one, and the nursery area has been enlarged, their locations were very similar during the period of significance. Shed # 2 probably contained tools and supplies related to greenhouse and nursery activities. Shed # 1 has been called "Jeep Shed" and was situated along the driveway to allow parking access for the ranch jeep. This structure may not have been directly associated with nursery activities, but appears to have been located away from the house in order to maintain a more formal aesthetic atmosphere near the residential cluster. The existing water tank and the removed water tanks (see water system maps in Appendix) associated with this cluster accumulated rainwater from the greenhouse, which doubled as a rain shed.

Summary

Generally speaking, water tanks (in both clusters) were located in close proximity to their respective rain sheds in order to allow consistent oversight and maintenance, to procure the maximum attainable water head from each water source, and to create the least amount of infrastructure and visual impacts. These concerns, along with the distinct clustering of residential and nursery related functions, are still visible on the landscape. As a result, the current cluster arrangement is much the same as it was during the period of significance. Therefore, this characteristic remains intact and contributes to the significance of the 'Ainahou Ranch House and Gardens.

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.

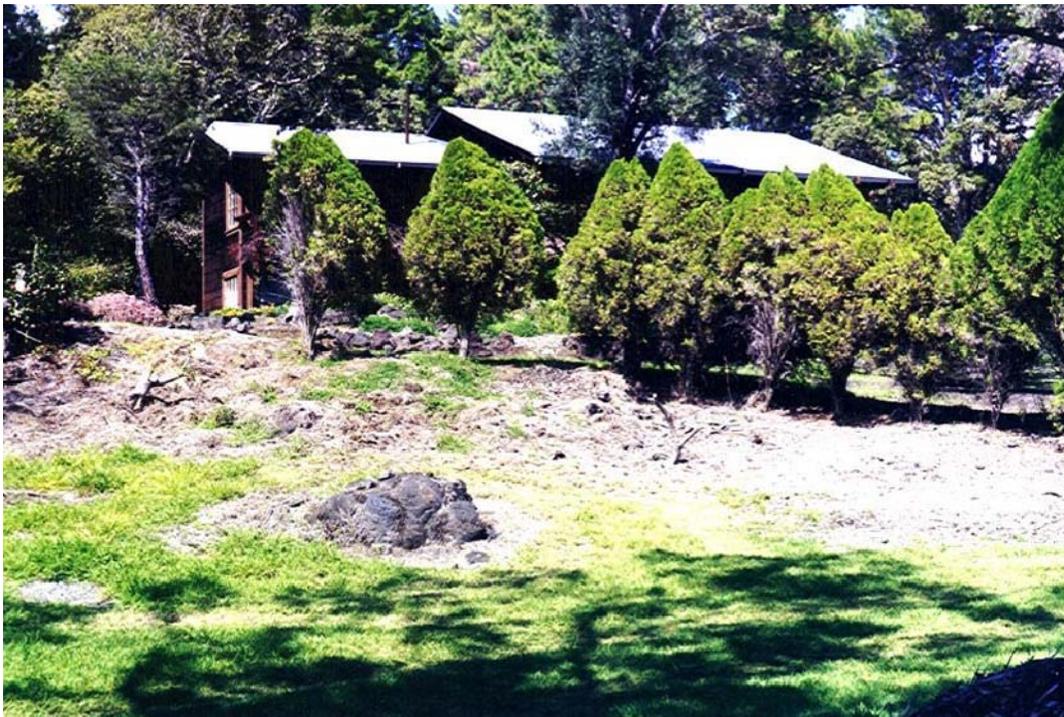
The spatial organization of the 'Ainahou Ranch House and Gardens is heavily influenced by natural features such as topography and native vegetation, and therefore has an overall lack of linearity, symmetry, and patterning often associated with more formal landscapes. Topography played a key role in the overall spatial organization of the site with respect to water-system planning. There is clearly a high-to-low organizational pattern beginning with the main rain sheds, then the residential cluster, then the nursery area, and finally the livestock facilities. As in all gravity-powered water systems, water retrieval and storage is emphasized at the upper end of the system to ensure adequate pressurization. Shipman's complex and interconnected system of primary and supplementary water collection and storage devices indicate a high degree of utilitarian function and organizational planning in the landscape. Attention to aesthetics is also apparent in the vertical organization, which enabled the ranch house to have a view over gardens and pastures toward the ocean.

The spatial organization of the ranch house gardens is highly irregular, resulting from the integration of existing native vegetation and small-scale topographic features such as lava outcrops (see photo, Spatial Organization # 1). Throughout the component landscape there are subtle reminders that Shipman attempted to create a landscape that was complementary with the surrounding natural beauty: the ranch house is nestled at the edge of the forest and not a central feature, exotic plants and native plants are often arranged together in clusters defined by existing topography, and cattle fences were often supported by large 'ohi'a trees. With the exception of the cork oak grove, there is generally a lack of distinct sections and grid patterns in the planted exotic vegetation, making it less incongruous with the wilderness surroundings. Incorporation of lava outcrops and ubiquitous native species (particularly 'ohi'a which thrives on rock outcrops) within the component landscape accomplishes harmony and unity in the garden design, which might otherwise appear chaotic given the great variety (and lack of patterning) of exotic species. Curvilinear patterns of hedges, palms, and pine trees complement circulation patterns (see Circulation section) and natural escarpments in several instances (see photos, Spatial Organization # 2, Spatial Organization # 3). The pattern of open spaces within the component landscape is also highly asymmetrical, which helps to blend the component landscape with the natural forest surroundings (see photo, Spatial Organization # 4).

The overall spatial organization of the component landscape has not been substantially altered following the period of significance. Although the area within the driveway loop has been significantly altered by invasive vegetation, and the removal / deterioration of fences within the component landscape also detracts from its historical spatial organization, the landscape characteristic contributes to the significance of the 'Ainahou Ranch House and Gardens.



Spatial Organization # 1: From balcony looking south. Note influence of small-scale topography on aesthetics and spatial organization of vegetation (PWR, HAVO, CLI files, 2003).



Spatial Organization # 2: Hedge of arborvitae lines the driveway (hidden from view) and the shallow end of a natural escarpment (PWR, HAVO, CLI files, 1999).



Spatial Organization # 3: Row of dwarf date palms lines the driveway near the east side of the ranch house (PWR, HAVO, CLI, 2003).



Spatial Organization # 4: An open space creating an informal corridor between the ranch house and the nursery area (PWR, HAVO, CLI files, 2003).

Circulation

Circulation is defined as spaces, features, and applied material finishes which constitute systems of movement in a landscape.

Roads

The primary circulation patterns at 'Ainahou Ranch House and Gardens still remain intact. 'Ainahou Ranch Road is a roughly graded dirt and gravel road that connects Chain of Craters Road to the ranch house vicinity about one mile south-southwest. The road then meanders down slope to the south for approximately two miles where it approaches Poliokeawe Pali (cliff). The road was previously a wagon trail, but accommodated motor vehicles during the period of significance. It is not known whether or to what extent Shipman improved the road during the period of significance. A small portion of 'Ainahou Ranch Road (near its intersection with the ranch house driveway) is included in the component landscape.

The driveway consists of a short spur (ca. 200 ft.) that forks into a loop (ca. 1400 ft.), the west end of which circulates very near to the house. This driveway was added by Shipman during the period of significance. Historic photographs suggest that the northern portion of the loop (see photo, Circulation # 1) may have existed for a few years as a singular driveway before the southern portion was developed and the current loop pattern created. The driveway appears to have been graded smoother than 'Ainahou Ranch Road but still contains some bumps, particularly on the northern loop portion. The driveway is not wide enough to allow two cars to pass each other in most sections.

Walkways

Mortared lava rock walkways exist on the southern and eastern sides of the house (see Buildings & Structures map in Appendix). The walkway to the east appears the least formal of the two, and allows passage from the bunkhouse to main house via a back door to the dining room. Another segment leads to the driveway, descending a few steps. Still another segment wraps around the east side of the house to the salt room entrance on the north side. The width of the east walkway is about three feet. The width of the walkway to the south of the house is about five feet and varies between ten and fifteen feet at the west end to correspond with the serpentine walls on either side. A large camellia grows in the center of the walkway at its widest point.

The south walkway ends abruptly, emptying onto the western lawn, where the circulation patterns are rather well-defined by hedgerows and other vegetation. At this juncture, one is compelled to turn southeast, northwest, or enter through a narrow gap in the boxwood hedgerow to the western lawn area (see photo, Circulation # 2). A dracaena hedgerow veers to the west atop a five foot high natural escarpment, continuing from the northernmost boxwood. From the southernmost boxwood an arborvitae hedgerow veers to the southeast, lining the path around a prominent garden bed back towards the driveway south of the ranch house. With the exception of the gap directly across from the end of the southern rock walkway, the arborvitae-boxwood-dracaena hedgerow spans continuously for 180 feet (see Vegetation Map, Enlargement A in Appendix). Therefore, this vegetative feature is greatly influences circulation in the landscape. The stone garden beds and cluster of slash pines to the northwest of the house also help influence movement on the western side of the house, where there is a notable absence of roads and formal walkways.

Most of the peripheral footpaths from the period of significance have mostly been grown over by vegetation. One footpath, which leads from the house area to the two main rain sheds north of the landscape boundary has been consistently used by the NPS and therefore has not been overgrown. It is not certain whether the course of this path is completely unchanged, but it is believed to be very similar

if not the same path as one that was used during the period of significance. The trail traverses native forest and occurs primarily outside of the cultural landscape boundary. Presumably, there were several footpaths during the period of significance that connected various pastures and ranching facilities, but dense vegetation has concealed their locations.

NON-CONTRIBUTING

Following the period of significance, the NPS has added gravel to some of the roughest sections of 'Ainahou Ranch Road and paved a short stretch that was too steep to retain gravel. A new turn-off from Chain of Craters Road had to be excavated after lava flows (several feet thick) covered portions of 'Ainahou Ranch Road and Chain of Craters Road in the early 1970s (outside landscape boundary). The alignment of the first few hundred feet of 'Ainahou Ranch Road and the man-made rock escarpments on either side are therefore inconsistent with the historic period of significance.

The NPS has also widened the shoulder of a segment of the southern portion of the driveway loop to create a small gravel parking area (ca. 2001). This parking area is unmarked and relatively unobtrusive, and is located approximately halfway between the ranch house and the corral.

A three-pronged truck path loop extending to the west of Shipman's driveway loop was also added after the period of significance (see Site Plan). The truck path is a shortly mowed route in the grass that allows NPS work trucks to access the nursery area without having to make a U-turn. The path is not graded or otherwise developed and has a minor visual impact on the landscape. An extra leg dissects this loop, creating the shortest route between the nursery and the ranch house. This route is somewhat less apparent since the area it traverses is also mowed regularly. Based on the lack of obstructing vegetation, and the assumed connectivity between the ranch house and the greenhouse, the middle leg of this truck path was probably a frequented footpath during the period of significance. It is also possible that Shipman's original Nene pens were located in this area (Markiewicz, 1999), which would have constituted a need for pedestrian circulation. However, the contemporary use of this route for vehicular access is not consistent with the period of significance.

There are currently many temporary footpaths that are being used by NPS researchers to access bird and insect monitoring equipment that is located in various locations just beyond the landscape boundary. The monitoring equipment is not readily visible from within the cultural landscape boundary, whereas some of the access trails are. Although this peripheral area may have contained trails during the period of significance, these footpaths and their resulting circulation patterns are non-contributing.

SUMMARY

Most of the alterations to historic circulation patterns are of a temporary nature and/or are not visually obtrusive. The deterioration / removal of fence patterns within the component landscape and the concealment of footpaths by vegetation may have caused a loss of pedestrian circulation patterns (particularly ones leading out from the component landscape to various pastures etc.) that were present during the period of significance. The major pedestrian circulation patterns at the core of the component landscape remain primarily unchanged, along with Shipman's driveway loop. Therefore, circulation is a contributing landscape characteristic of the 'Ainahou Ranch House and Gardens.



Circulation # 1: Northern portion of the driveway loop, looking southwest towards the ranch house (PWR, HAVO, CLI files, 1999).



Circulation # 2: Formal walkway / patio on the south side of the ranch house gives way to multiple grass corridors through the gardens in the western lawn area, looking west (PWR, HAVO, CLI files, 2003).

Characteristic Feature	Type Of Contribution	LCS Structure Name	IDLCS Number	Structure Number
'Ainahou Ranch Road and driveway loop	Contributing			
Formal walkways (mortared stone)	Contributing			
Informal walkways (garden corridors)	Contributing			
Trail from ranch house to main rain sheds	Contributing			
Gravel parking area	Non-Contributing			
NPS temporary footpaths for eco-monitoring projects	Non-Contributing			
NPS truck path	Non-Contributing			

Vegetation

Vegetation analysis may include deciduous and evergreen trees, shrubs, vines, ground covers and herbaceous plants and plant communities, whether indigenous or introduced in the landscape.

Vegetation analysis and plant identification for this CLI were greatly assisted by the efforts of Wilhelmina Markiewicz and Linda Pratt respectively. Primary literary references for cross-referencing common names and Latin nomenclature were Neal (1965) and Wagner, Herbst, and Sohmer (1990).

Native, pastoral, and horticultural vegetation all merge within the landscape boundary, creating a diversified landscape indicative of its past and present land uses. Native tree species common to the region have been conserved both by Shipman during the period of significance and by the National Park Service in subsequent years. However, introduced pasture grasses are well-established throughout the ranch and probably limit the abundance of native understory species that would otherwise flourish in this area. The landscape immediately surrounding the ranch house is endowed with several plants that clearly indicate the area's prior use and design by an avid horticulturalist. While some of the species that Shipman planted were later deemed invasive and removed by the NPS, several exotic trees, shrubs, and herbs still remain intact where he left them. The vegetation within the landscape boundary contributes greatly to the cultural landscape.

The areas outside of the landscape boundary are relatively void of contributing species with the exception of pasture grasses and volunteers that dispersed from historic plantings. The landscape boundary was not extended to include slash pines (*Pinus caribaea*) and Russian olive trees (*Elaeagnus angustifolia*) of a younger generation that are clearly offspring from the original plantings.

Individual plants were mapped within the landscape boundary whereas vegetation outside the boundary is generalized (see vegetation maps in Appendix). The vegetation beyond the landscape boundary falls into one of two categories: 1) Open-canopy 'ohi'a forest (*Metrosideros polymorpha*) with an understory of native shrubs and introduced grasses 2) Overgrown pasture with native shrubs and intermittent 'ohi'a. Despite persistent management for invasive species, faya tree (*Morella faya*) maintains a notable presence throughout.

Native vegetation, Shipman's exotic introductions, and pasture grasses are all juxtaposed in the component landscape. Since Shipman sought to integrate irregular topographic features and existing native vegetation, there is an overall lack of linearity, symmetry, and patterning often associated with more formal landscapes. Curvilinear hedgerows complement circulation patterns in some instances. With the exception of the cork oak (*Quercus suber*) grove, the component landscape lacks distinct sections that can be easily characterized by one or more plant species. Therefore, the following discussion is organized categorically rather than spatially. For more detailed spatial descriptions, refer to vegetation maps in the appendix.

NATIVE SPECIES

Existing 'ohi'a trees (*Metrosideros polymorpha*) were integrated into the garden landscape during the period of significance and in many instances served as living fence posts for cattle fences that surrounded the ranch house grounds. Since the rocky substrate does not permit easy penetration for conventional fence posts, fence posts were instead bound to 'ohi'a trees. By not attaching the fence tension directly to the trees, Shipman seemingly attempted not to girdle and thereby destroy the 'ohi'a trees. Very old 'ohi'a trees with evidence of such use still remain in the landscape.

Other frequently occurring native plants within the landscape boundary are 'a'ali'i (*Dodonaea viscosa*)

and pukiawe (*Styphelia tameiameia*). Many 'a'ali'i and a few pukiawe appear on rock outcrops seemingly as part of the landscape design, but their stature and ubiquity suggests that they may have volunteered after the period of significance. It is likely that Shipman would not have had 'a'ali'i so prominently displayed in his garden beds, since it is very abundant in the surrounding landscape. However, the crimson color of the fruiting 'a'ali'i would have undoubtedly decorated the surrounding views in Shipman's time as well. Therefore, 'a'ali'i should be considered contributing to the landscape until further research on their presence during the period of significance can be completed. Pukiawe is a hardy, low-growing native shrub that is also abundant in the area. It is unlikely that Shipman went to great lengths to remove it from the landscape. However, it too was probably not featured prominently in the gardens surrounding the ranch house.

A large native sandalwood tree (*Santalum paniculatum*) (see photo, Vegetation # 1) can be found north of the slash pines bordering the driveway (see Vegetation Map, Enlargement C in Appendix). Two younger sandalwoods also line the driveway, not far from the older one, that may date to the period of significance. Another contributing native feature is the hala pepe tree (*Pleomele* sp.) along the east side of the ranch house (see photo, Vegetation # 2).

'Ulei shrubs (*Osteomeles anthyllidifolia*) occur randomly on the premises but at least three individuals occur within the landscape boundary. One of these lines the driveway to the south of the ranch house, and may possibly date to the period of significance.

A mature ho'awa tree (*Pittosporum* sp.) and pilo tree (*Coprosma menziesii*) grows in the west lawn (Vegetation Map, Enlargement A in Appendix). Another old ho'awa tree in the western lawn area died and was replaced in 1996 in conjunction with Russel Bickler's unofficial memorial. Pilo and ho'awa dating to the period of significance are considered to be contributing to the landscape.

A cluster of mamaki trees (*Pipturus abidus*) and two wiliwili trees (*Erinthrina sandwicensis*) border the southern lawn area to the east. The wiliwili trees may exist from the period of significance whereas the mamaki appear too young. Three young mamaki trees have also emerged in the beds surrounding the house and in other locations on the premises. It is not certain whether the current distribution of mamaki trees is completely naturally occurring or if parent trees were in fact planted by Shipman. Mamaki appears to be more abundant on the house grounds than in the surrounding landscape.

Several naturally occurring and planted mamane trees (*Sophora chrysophylla*) can be seen on the premises. The group of small mamane trees on the north lawn was planted by a volunteer group after the period of significance, but several older trees are randomly located within the component landscape. Mamane trees are extremely slow-growing. Therefore, despite their shorter appearances, it is reasonably safe to assume that some of the existing mamane trees within the landscape boundary were present during the period of significance. Mamane was certainly present in the parent landscape during the period of significance.

Other minor native plants on-site include three herbaceous ground covers known as nehe (*Lipochaeta* sp.), 'ilie'e (*Plumbago zeylanica*) and 'ihi (*Portulaca lutea*), and two native sedges: *Cyperus polystachyos* and *Carex wahuensis*. Some of the native herbs and a native vine called huehue (*Cocculus trilobus*) may have spread from the nursery area after the NPS began propagating native plants there. It is not known whether these vegetation features are contributing. The two sedges were probably present during the period of significance.

A small cluster of native and non-native vegetation to the west of the house was unofficially designated as a memorial for a deceased NPS employee. The area that some refer to as "Bickler's memorial" is the

group of plants to the north of the row of dracaena, immediately surrounding the passion fruit vine (see Vegetation Map, Enlargement A in Appendix). The mamaki, mamane, and 'a'ali'i shrubs and nehe groundcover in this circular cluster are all native species that volunteered and were not mowed. However, the ho'awa tree was planted very near the location of an old ho'awa tree that had previously died; the ho'awa tree that died was likely a remnant of the period of significance. While these native species are generally contributing, perhaps only the ho'awa existed in this location during the period of significance.

In general, Shipman is not thought to have planted many native Hawaiian plants in his gardens. With the exception of the hala pepe tree placed near the eastern door of the house in a garden bed, it is difficult to rule out the possibility that all other natives from the period of significance volunteered in-situ. However, it is apparent that he valued native vegetation and sought to integrate existing native plants with his ranching activities and garden designs. Therefore all native species, unless otherwise noted, can be considered contributing until further research can be completed.

SHIPMAN'S INTRODUCTIONS

Shipman was a horticultural enthusiast who cherished orchids and exotic plants from around the globe, and took pride in showcasing them at his homes in Kea'au and 'Ainahou. He is known to have brought plants to 'Ainahou from Kew Gardens in England and other travel destinations around the world, and to have received many plants as gifts from esteemed visitors from abroad.

Lost

Contributing plant features that were lost fall into two main categories: Plants that Shipman removed when he vacated the premises and plants that the National Park Service deemed invasive and removed after acquiring the property. A third, more ambiguous category consists of plants that died off from lack of maintenance and natural causes.

Shipman took with him nearly all the species of orchids that he cultivated at 'Ainahou Ranch and other plants that were potted and therefore easy to transport. He also dug-up favorite plants from the grounds such as holly, various camellias, magnolia, and young pine trees (Thomas English, personal comm., 2003). Fortunately, he did not take all of these rooted plants; their counterparts still thrive in the component landscape today.

Several of Shipman's plantings were later found to be invasive and were removed or controlled by the National Park Service: loquat (*Eriobotria japonica*), Formosan koa (*Acacia confusa*), white ash (*Fraxinus americana*), paper bark eucalyptus (*Melaleuca quinquenervia*), Australian blackwood (*Acacia melanoxylon*), black wattle (*Acacia mearnsi*), English ivy (*Hedera helix*), and Russian olive (*Elaeagnus angustifolia*).

Although the original Russian olive tree was cut down, its prolific offspring still plague this area of the park from both a historical and biological conservation standpoint (see Vegetation Map, Enlargements C and D in Appendix). The status of these and other invasive species in the component landscape would be far worse, were it not for the ongoing efforts by NPS volunteers to remove saplings emerging from the seed bank.

Other lost features consist of plants that may have died from lack of maintenance or being shaded out by more persistent plants such as Russian olive. More than twenty-five years passed after Shipman vacated before significant caretaking occurred on the ranch house grounds. NPS maintenance records indicate that trees were pruned and fertilized once between 1976 and 1978 and "desirable yard areas" cleared. Records also indicate that a volunteer group also helped NPS clean up debris around the ranch house in

1989. Prior to 1997, most NPS landscape work at 'Ainahou was probably conducted chiefly on account of controlling invasive species, protecting Nene geese and other native species, and decreasing fire risk and other hazards, rather than maintaining historic landscape characteristics.

Features that were lost from lack of maintenance are poorly documented. A dawn redwood tree (*Metasequoia glyptostroboides*) recently died just south of the house near the existing plumeria trees. There may once have been as many as ten in this general area. Apple trees were said to exist (Karl Rhoner, personal comm., 2003) and can no longer be found. Also, the grounds were home to several varieties of roses, only one of which can be found today. Several varieties of fuchsias, begonias, and geraniums were also said to exist. It remains a possibility that some of the latter items were also removed by Shipman upon vacating.

Existing (Contributing)

Much of the vegetation that Shipman planted at 'Ainahou still exists today (for locations see vegetation maps in Appendix). Six different species of pine trees, several ornamental trees, fruit and nut trees, shrubs, decorative herbs, and one cactus managed to survive unattended for over two decades, until NPS staff and volunteers reclaimed them from the weeds. Following the period of significance, National Park Service staff and volunteers also made their own contributions to the gardens that are not contributing to the landscape (discussed later).

Slash Pines (*Pinus caribaea*) line the northern driveway and occur prominently at several locations within the component landscape. Other pines include a row of loblolly pines (*Pinus taeda*), scattered Italian stone pines (*Pinus pinea*) (see photo, Vegetation # 3), a small group of Norfolk pines (*Araucaria heterophylla*), a short row of tsugi pines (*Cryptomeria japonica*) (see photo, Vegetation # 4), two Mexican weeping pines (*Pinus patula*), and two kauri pines (*Agathis australis*).

Fruit and nut trees scattered throughout the component landscape accentuate Shipman's love for diversity. The largest cluster of a homogenous fruit type would be four or five persimmon trees (*Diospyros virginiana*) near where the road forks into the northern and southern driveways. Citrus trees include: lime (*Citrus aurantiifolia*), rough lemon (*Citrus limonica*), and tangerines (*Citrus nobilis deliciosa*). Four avocado trees (*Persea americana*) line the west side of the nursery, and a handful of mature carob trees (*Ceratonia siliqua*) can be found to the east of the nursery area. There is also a significant number of cherimoya trees (*Annona reticulata*) scattered around the property. Other less abundant fruit trees include: peach (*Prunus* sp.), Fig (*Ficus* sp.), mulberry (*Morus alba*), kumquat (*Fortunella japonica*), guavasteen (*Feijoa sellowiana*), plum (*Prunus* sp.), and two loquat volunteers (*Eriobotria japonica*) that sprang up after NPS staff removed their parent tree(s). Three types of nut trees still thrive as well: macadamia nut (*Macadamia integrifolia*), kukui nut (*Aleurites moluccana*), and chestnut (*Castanea dentata*).

A large European olive tree (*Olea europaea*) grows in the bed on the west side of the stone patio; however, its counterpart on the east side was cut down due to the tree leaning towards the house. A European olive sapling has re-grown from the stump and is being trained to grow away from the house. It is not certain when the parent tree was removed, probably sometime in the 1970s or early 1980s.

In addition to the list of pine trees, many of Shipman's other non-utilitarian trees remain as well. A small grove of cork oaks (*Quercus suber*) is located on the north side of the entrance road (see Vegetation Map, Enlargement E in Appendix). A few cork oaks also line the driveway near the east side of the ranch house, the east side of the nursery area, and one very large tree is placed prominently in the backyard. The latter needs maintaining so that its branches do not interfere with the house structure, but the tree itself leans comfortably away from the house. The tree sizes in the cork oak grove are varied, but on

average much smaller than the ones near the house (see photo, Vegetation # 5); some appear to be dying.

A row of dwarf date palms (*Phoenix robellinii*) lines the driveway to the east of the ranch house, and a pair border the walkway to the eastern door of the house. Three elengi trees (*Mimusops elengi*) surround the water tank to the east of the house. An American elm (*Ulmus americana*) can be found north of the slash pines that line the north driveway. An ornamental pear tree (*Pyrus kawakami*), a California live oak (*Quercus agrifolia*), and two plumeria trees (*Plumeria* sp.) grow in the western lawn area. Also two magnolia trees (*Magnolia grandiflora*) grow to the southeast of the ranch house.

There are several species of Shipman's ornamental shrubs that have been well maintained by NPS volunteers and staff. There is a hedge of boxwoods (*Buxus sempervirens*) bordering the driveway on the east side of the house, multiple hedges of arborvitae (*Thuja orientalis*) to the west and southwest of the house, and a hedge of dracaena (*Dracaena* sp.) lining the topside of a basalt outcropping to the west of the house. Two varieties of camellia (*Camellia japonica*, and *C. sasanqua*) can be found independently and in small clusters throughout the vicinity of the ranch house. Camellias are known to be one of Shipman's favorite plants. Several camellias, possibly the rarer varieties, were taken with him when he vacated 'Ainahou Ranch House.

Other, less prevalent ornamental shrubs include white and pink azaleas (*Rhododendron* sp.), plumbago (*Plumbago auriculata*) (see photo, Vegetation # 6), English holly (*Ilex aquifolium*), Chinese holly (*Ilex cornuta*), woodbine (*Lonicera periclymenum*), and kokotan (*Rhaphiolepis umbellata*). Climbing roses (*Rosa* sp.) still survive on the west side of the nursery area, but many more roses and types of roses are thought to have grown in the component landscape during the period of significance.

Many of the herbaceous plants found in the component landscape today were introduced by volunteer caretakers at the 'Ainahou Ranch House grounds. A few contributing herb species still remain. Ground orchids (*Epidendrum obrieniiannun*) decorate one of the basalt outcroppings in the southern lawn area, and are unfortunately the only orchid variety still represented in the landscape.

Several species of Shipman's lilies are still thriving near the ranch house (see photos, Vegetation # 7 & Vegetation # 8). *Neomarica* (*Neomarica* sp.), a type of iris, is the most widespread and can be seen growing in beds surrounding the house, as well as in more remote and untended locations under 'ohi'a trees and brush. Other sorts limited to the more immediate vicinity of the house include: zephyrs (*Zephyranthes rosea*), crinums (*Crinum asiaticum*), day lilies (*Hemerocallis flava*), narcissus (*Narcissus* sp.), and aristeas (*Aristea gerrardii*) – another type of iris. Near the water tank to the east of the house a few watsonias (*Watsonia iridifolia*) still survive amidst the tall grass. According to Donn Carlsmith, there was a field of watsonia in this area, and a field of Irish potatoes to the southeast of that (W. Markiewicz, 1995).

With the exception of the reference to potatoes, there is little or no indication that Shipman grew many vegetables in the component landscape (W. Markiewicz, personal comm., 2003). Rare orchids and other ornamental plants were his delight. Several varieties of begonias and fuchsias adorned the house grounds during the period of significance that are now missing. NPS volunteers planted one species of begonia (*Begoniaceae* sp.) that closely resembles one of the species that Shipman cultivated, but other varieties are known to have existed during the period of significance. The white geraniums (*Geranium* sp.) under the slash pines near the lua (outhouse) are of a contributing variety that still renews itself, but the colored ones in the planters are introduced by NPS volunteers (W. Markiewicz, personal comm., 2003). The contributing varieties are labeled white geranium (WG) on the vegetation maps (see Appendix); other non-contributing varieties are generalized and labeled geranium (Ge).

The following vine species were also present during the period of significance: mustang grape (*Vitis* sp.), white Concord grape (*Vitus* sp.), English ivy (*Hedera helix*), and passion fruit (*Passiflora edulis*). The mustang grape continues to grow on the balcony railing above the patio area on the southern side of the house. Concord grapes grow on a trellis near the nursery area and on existing vegetation under the slash pines adjacent to the northern driveway. The English ivy and passion fruit have both been deemed invasive and removed by NPS. A small passion fruit vine can currently be seen emerging in the garden area west of the ranch house.

Gold fern (*Pityrogramma chrysophylla*) can be seen near the east entrance to the house. This fern species may remain from the period of significance, but may have volunteered in its current location during or after the period of significance. This fern commonly accompanies other potted plants and was possibly an unintentional introduction to the landscape. It should be considered a contributing feature until further research can be conducted.

Two contributing plants that do not fit easily into other categories are a spineless prickly pear (*Opuntia ficus-indica*) and Kalanchoe (*Kalanchoe pinnata*) a low-growing succulent found in two stone planters near the ranch house.

NON-CONTRIBUTING EXOTIC SPECIES

Non-contributing exotic plants in the component landscape fall into two categories: naturalized and planted. Plants of the former category were not comprehensively mapped, whereas deliberately planted aliens were. Of the naturalized species, many are highly invasive and have been targeted for removal by NPS personnel and volunteers. These plants have mostly been kept out of the landscape boundary where efforts have been focused, but they still persist in the periphery and warrant a thorough vegetation management plan. Planted aliens consist of non-invasive garden varieties, which were planted around the house by caretakers of 'Ainahou since the late 1990s.

Naturalized

Faya tree (*Morella faya*) is a highly invasive species that has become problematic in the parent and component landscapes at 'Ainahou, as well as in many other areas within Hawai'i Volcanoes National Park and elsewhere on the Big Island. Although its presence in Hawai'i was first recorded in 1926, it did not become widespread and problematic in Hawai'i Volcanoes National Park until recent decades, and would not have been a common landscape feature during the period of significance.

Another naturalized species, which can be seen growing in the component landscape, is the common guava (*Psidium guajava*). This may have been present during the period of significance but was not introduced by Shipman. Common guava was introduced to Hawai'i in the early 1800s and is now a widespread pest. It's incursion upon the component cultural landscape at 'Ainahou is minor relative to that of faya tree. Lantana (*Lantana camara*), cayenne vervain (*Stachytarpheta australis*), and Marsh Fleabane (*Pluchea* sp.) are other notable alien shrubs present in the landscape, which Shipman was not likely responsible for bringing. Lantana and cayenne vervain were naturalized in the Hawaiian Islands as early as the 1870s and were likely present at 'Ainahou during the period of significance. Marsh fleabane is not as widespread, and naturalized much later, and is therefore unlikely to have had a presence at 'Ainahou during Shipman's time. Alien grasses, sedges, herbs, and ferns are discussed separately in the following section.

Alien species control efforts are extensive and ongoing at Hawai'i Volcanoes National Park. Without these efforts, a host of other alien species would have a significant presence at 'Ainahou.

Planted

As previously noted, NPS employees and volunteers have introduced several non-contributing plant species to the component landscape at 'Ainahou following the period of significance. Most of the new introductions were planted in the immediate vicinity of the house by volunteers after 1996. When introducing new species to the landscape, the volunteers ensured that they were not invasive species and attempted to choose varieties that were popular garden plants during the historic period. However, it should be noted that Shipman had a reputation for importing and showcasing as many uncommon species as possible. Fortunately, most or all of the volunteers' new introductions are small herbaceous plants that could easily be removed if necessary.

The following ornamental plants have been introduced by volunteers since about 1997 and are non-contributing (see vegetation maps in Appendix): looking glass plant (*Coprosma repens*), violets (*Viola* sp.), shasta daisies (*Chrysanthemum maximum*), begonias (*Begonia* sp.), ligularias (*Ligularia tussilaginea*), marigold (*Tagetes* sp.), yarrow (*Achillea* sp.), calliopsis (*Coreopsis* sp.), geraniums (*Geranium* sp.), lantern hibiscus (*Hibiscus schizopetalus*), a native hibiscus locally named ma'o hau hele (*Hibiscus schizopetalus*), periwinkles (*Vinca* sp.), and vireya (*Rhododendron* sp.). The following culinary herbs were also planted by volunteers and are also non-contributing: fennel (*Foeniculum* sp.), rosemary (*Rosmarinus officinalis*), lavender (*Lavandula officinalis*), and lemongrass (*Cymbopogon refractus*).

Legularia is rumored to have grown on-site during the period of significance at an unknown location and vireya is said to have grown in numerous locations (Donn Carlsmith interview by W. Markiewicz, 1997). The volunteers were also mindful of historic conditions by planting begonias and geraniums, but little is known about the locations and varieties used by Shipman, thus these features are not considered contributing to the historic landscape.

A small pomelo (*Citrus paradise*) tree in the planter south of the house was also added by volunteers, and the banana trees (*Musa* sp.) by the nursery area were planted by NPS employees for lunch-time supplements.

Several ti plants (*Coryline frutiosa*) can be seen growing around the house at 'Ainahou. Ti is a naturalized Polynesian introduction that is used in landscaping, cooking, crafts, and ceremonies. The National Park Service planted some ti plants at 'Ainahou in the 1990s to provide leaves for their own ceremonious occasions. Apparently, this does not account for all of the existing ti plants on the landscape. Although a common landscape ornament in Hawai'i, Shipman probably did not decorate the component landscape with this plant feature. Shipman tended to plant rare and foreign decorative plants. Furthermore, ti plants from the period of significance would have been visibly older than the ones known to have been planted in the late 1990s. It is plausible that NPS documentation of ti plantings is not comprehensive of employees and volunteers. Ti is most likely non-contributing to the historic period.

The ti plants and hibiscus (*Sida* sp.) north of the dracaena hedge are non-native, non-contributing features associated with "Bickler's memorial".

A few other garden varieties were planted by NPS volunteers since the late 1990s, which subsequently died and are no longer part of existing conditions. A list of these plants is on file at the Hawai'i Volcanoes National Park Cultural Resource Office.

PASTURE GRASSES AND OTHER UBIQUITOUS GROUNDCOVERS

The native flora of the Hawaiian Islands is relatively void of grass species due to the co-evolution and symbiosis with large herbivores, which are incapable of long distance oceanic dispersal. Therefore, pasture landscapes in Hawai'i are nearly entirely composed of non-native species. Many of the delicate

native species with low-growing statures face(d) endangerment or extinction after the Western introductions of pasture grasses and livestock. Feral livestock severely damaged native ecosystems in Hawai'i Volcanoes National Park before organized efforts brought their populations under control.

Of the grass and other ubiquitous groundcover species sampled within the landscape boundary, only two sedges and three herbs were native species (listed in native species section), all of them making up a very minor fraction of the total coverage. The herb species can only be seen emerging in areas where alien grasses are controlled.

Of the long list of alien species that were sampled, we speculate that the following five may have been intentionally introduced by Shipman for fodder: pangola grass (*Digitaria eriantha*), molasses grass (*Melinis minutiflora*), kikuyu grass (*Pennisetum clandestinum*), Spanish clover (*Desmodium sandwicense*), and sweet pea (*Lathyrus odoratus*).

Pangola grass is a highly nutritious forage grass that tolerates poor soils and dry conditions. Shipman was the first person to introduce pangola to the Ka'u region (Fred Koehnen, personal comm., 2003). Molasses grass is perhaps even more dominant than pangola, within the landscape boundary. Because of its anomalously high concentrations at 'Ainahou Ranch, and its reputation as a hardy forage grass, it too is likely a contributing grass species.

Kikuyu grass is not as prevalent as pangola and molasses grasses. However, kikuyu is exceptionally high in protein and is known to be one of the earliest pasture grasses to be used in East Hawai'i. Kikuyu is the dominant pasture grass in the upper regions of Keauhou Ranch, which formerly included the 'Ainahou Ranch lands. Conceivably, kikuyu may have been present before Shipman purchased the lease, after which he decided to bring in pangola and other forages to improve productivity. Pangola grass is better adapted to low-fertility soils than kikuyu grass (Hawai'i Cooperative Extension Service, leaflet 102, 1966).

Spanish clover is also widespread in Hawai'i, but its high concentration in the component landscape (relative to other locations in Hawai'i Volcanoes National Park) suggests that it was planted there. Since quantity and quality of soils in this geologically infantile landscape are both lacking, it is highly probable that a knowledgeable horticulturalist like Shipman would have sought to benefit from the soil-building and nitrogen-fixing properties of this leguminous plant. Sweet pea, the other leguminous groundcover that we speculate was intentionally introduced by Shipman, is less prevalent.

Elephant grass (*Pennisetum purpureum*), which grows in clumps over ten feet tall, was also introduced by Shipman, more likely for its ornamental value than for fodder. Small patches of this tall grass can be seen along the roadside as one nears the ranch house grounds. No elephant grass occurs within the maintained areas of the landscape.

Bush beardgrass (*Schizachryim condensatum*), broomsedge (*Andropogon virginicus*), and scaly swordfern (*Nephrolepis multiflora*) have a moderate presence in the un-mowed periphery of the landscape boundary. However, due to their lack of agricultural importance and their similar concentrations elsewhere in the park, it is not very likely that Shipman had a hand in their colonization of the area.

Groundcover species encountered that have a very minor overall presence include: *Ageratum conyzoides*, hairy horseweed (*Conyza bonariensis*), hairy spurge (*Chamaesyce hirta*), buttonweed (*Spermacoce assurgens*), narrow-leaved plantain (*Plantago lanceolata*), dayflower (*Commelina diffusa*), crabgrass (*Digitaria* sp.), smutgrass (*Sporobolus africanus*), yellow foxtail (*Setaria gracilis*), and *kyllinga*

(*Kyllinga brevifolia*).

SUMMARY

The gardens surrounding the 'Ainahou Ranch House display a unique blend of native and exotic species that date to Shipman's occupation of the site. The layout of the gardens exhibits an overall lack of linearity, symmetry, and patterning often associated with more formal landscapes (see Vegetation maps in Appendix). This is partly due to the integration of existing native vegetation (notably 'ohi'a trees) and topographic features such as rock outcrops. The repetition of these natural features throughout the landscape accomplishes harmony and unity in the garden design, which might otherwise appear chaotic given the great variety (and lack of patterning) of exotic species. Exceptions to the seemingly random garden design are the curvilinear hedgerows that complement circulation features and pronounced contours in many instances, and the cork oak grove, which appears to have been planted in rows (although several are now missing creating a patchy effect). Many of Shipman's exotic trees and shrubs still remain from the period of significance. However, many of the smaller and less permanent features, such as geraniums, begonias, roses, and orchids have been lost or replaced with different plants and / or lawn. However, given the vast amount and variety of contributing trees and shrubs that remain, vegetation contributes to the significance of the 'Ainahou Ranch House and Gardens.



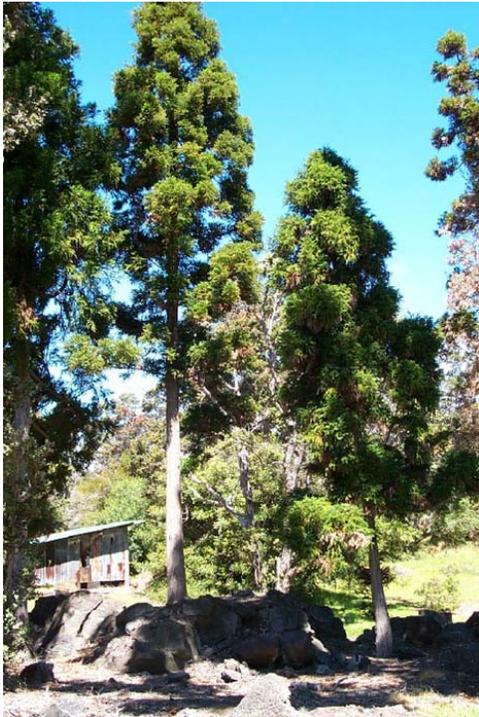
Vegetation # 1: Large native sandalwood north of driveway loop (PWR, HAVO, CLI files, 2003).



Vegetation # 2: Hala pepe tree fronting the east side of the ranch house (PWR, HAVO, CLI files, 2003).



Vegetation # 3: Italian stone pine with native 'ohi'a in the upper background and neomarica lilies in the foreground (PWR, HAVO, CLI files, 2003).



Vegetation # 4: Row of tsugi pines running parallel with natural rock formations (PWR, HAVO, CLI files, 2003).



Vegetation # 5: One of the Cork oaks in the grove. Tall 'ohi'a in background (PWR, HAVO, CLI files, 2003).



Vegetation # 6: Plumbago in bloom (PWR, HAVO, CLI files, 2003).



Vegetation # 7: Crinum lily in bloom (PWR, HAVO, CLI files, 2003).



Vegetation # 8: Zephyr lily in bloom (PWR, HAVO, CLI files, 2003).

Land Use

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

The historic land uses for the 'Ainahou Ranch House and Gardens included Shipman's use of the site as a mountain retreat and social center for family and friends, a base for ranching operations, a horticultural showcase, and a wildlife conservation area.

The 'Ainahou Ranch House was historically developed as a wilderness retreat. Following the period of significance the NPS has allowed several youth and educational groups to access to the 'Ainahou Ranch House to find solace or inspiration in this wilderness setting on day trips and weekend outings. The Friends of Hawai'i Volcanoes National Park also hosts educational groups and botanical societies who are interested in the history associated with 'Ainahou Ranch House and Gardens. While the house and gardens are no longer used as a residence, the contemporary use of the ranch house grounds to host wilderness outings and educational groups is compatible with the historical use of the landscape.

Since the ranch house functioned as the base of operations for a working ranch, livestock were historically part of the land use of the site. Eye-witness accounts (Zimmer & Mattos, 2003) and remaining evidence of historic-period fencing patterns indicate that livestock were historically present in the component landscape as well as the parent landscape. Features such as bull pens and birthing pens were located in close proximity to the ranch house. Although cattle are no longer present on the ranch, the NPS keeps horses in the corral (visible from the component landscape), continuing an association with the historic-period land use.

Although Shipman's cultivation of rare exotic plants (e.g. orchids) has been discontinued, the NPS now uses the nursery area to cultivate rare native plants. While the plant materials have changed, the use is consistent and continues the historic association between Shipman and rare-plant cultivation at the site.

Lastly, one of the most important historical uses of the ranch house grounds was for the conservation of the Nene (endangered Hawaiian goose). Shipman raised Nene at his coastal residence in Kea'au. He had a flock of forty-three Nene before the 1946 tidal wave (Apple, 1991). After the tidal wave, thirteen remained and were transported to the 'Ainahou Ranch House grounds for safe-keeping. Nene and turkey pens were built in 1954 (Jackson, 1997) to the south of the house (Thorne, 2003) however, the exact location of these pens is unknown.

Today, the Nene Project at Hawai'i Volcanoes National Park monitors the endangered Nene population and manages a breeding program. The NPS has observed that the Nene population in the 'Ainahou area has grown from eleven birds to approximately two-hundred (Sherry, 2003). Mongoose, rats, cats, pigs, nutritional deficiencies, and diseases have hindered the growth of the Nene population. However, the efforts of park staff have been instrumental in a steady growth in the population. Today, the Nene population at Hawai'i Volcanoes National Park is about 137, forty of which frequent the 'Ainahou Ranch House and Gardens vicinity on a regular basis (see photo, Land Use # 1) (Sherry, 2003). Management efforts to assist in the growth of the Nene population at the 'Ainahou Ranch House grounds include fencing, access restrictions during Nene breeding season, and continual monitoring of individual birds. During the breeding season, public access is prohibited if there is a display of breeding behavior such as nesting and egg-laying, or if Nene goslings are present. Otherwise, public access to the ranch house and grounds is allowed. The current use of the site for Nene conservation is appropriate and consistent with the historic-period use.

SUMMARY

Although the 'Ainahou Ranch House and Gardens no longer functions as a residence or a ranch, its current use as a wilderness destination for hosting educational groups and botanical societies, a working nursery, and a Nene sanctuary is compatible with historic period land uses. The significance of the continued use of the site as a Nene sanctuary in particular is of primary importance in Hawai'i, therefore land use contributes as a landscape characteristic to the significance of the 'Ainahou Ranch House and Gardens.



Land Use # 1: Contemporary photo of Nene feeding on grass at the 'Ainahou Ranch House grounds (PWR, HAVO, CLI files, 2003).

Small Scale Features

Small scale features are the elements that provide detail and diversity for both functional needs and aesthetic concerns in the landscape.

Small-scale features consist of fence-posts associated with cattle fences in the component landscape. These fences have been removed, but evidence of their spatial arrangement and construction techniques is found in the remaining features (see photos, Small-Scale Features # 1 & # 2). In some cases the features amount to little more than a few pieces of rusting wire attached to a living 'ohi'a tree. In other cases there is an 'ohi'a log attached to either side of a tree in a manner that would allow considerable tension to be applied without killing the tree. The locations of trees that display evidence of being used as a fence post are shown on the Site Plan (see Supplemental Information). Only a few specimens exhibit the 'ohi'a log attachments. It is not known whether such attachments were included on all trees that were used as posts. However, considering the extensive removal and deterioration of fences, it is likely that many may have been removed or fallen off after their bindings corroded.

Non-contributing

Two wooden benches, apparently constructed from local materials, can be found in proximity to the house. One is near the ornamental pear tree in the western lawn area. The other is located about halfway between the house and the lua. The seats are 'ohi'a logs split down the middle, flat side up, supported by one short 'ohi'a leg on either side. The benches are of a simple design and are rustic in appearance, but were added by volunteers in the late 1990s and are not contributing features.

The rain gauge in the western lawn area was installed by NPS in 1999 and is also a non-contributing feature (although Shipman did have multiple rain gauges at 'Ainahou that are now missing).

The fence surrounding the present nursery area and the tables within (supporting potted plants) are all non-contributing features in the component landscape. Although nearly the same area was designated as a nursery area during the period of significance, these features have been added by the NPS for propagating native plant species for ecological restoration projects. Within the nursery area there is also a temporary pavilion that provides a small, dry workspace during rainy weather.

Summary

Several non-contributing small-scale features currently exist in the component landscape, the majority of which are associated with the NPS nursery area. The general location of these features corresponds with the location of Shipman's old greenhouse, but the style and appearance of nursery accessories are significantly different (according to historic photographs). The fence post features have a unique appearance and carry important clues to the interpretation of the historic landscape in the absence of historic fences. While the small-scale features landscape characteristic no longer contributes to the significance of the 'Ainahou Ranch House and Gardens, the remaining fence posts date to the period of significance and should be treated as cultural resources.



Small-Scale Features # 1: Remnant fence post displaying use of live 'ohi'a trees (PWR, HAVO, CLI files, 2003).



Small-Scale Features # 2: Remnant conventional-type 'ohi'a fence post (PWR, HAVO, CLI files, 2003).