

Annual Report---- July 1, 2005 thru June 30, 2006

Cultural Resources Management Projects Performed Under the Ecosystems Management Program at the Pohakuloa Training Area, Island of Hawai'i, Hawai'i.

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EXECUTIVE SUMMARY

This report documents the results of the second year of a two year contract as outlined in the Scope of Work (SOW) for the Ecosystem Management Plan dated March 24, 2006 for Cultural Resources Activities at the Pōhakuloa Training Area (PTA), Kilauea Military Camp (KMC), Keaukaha Military Reservation Resource Center Building, and Kawaihae Military Reservation, Island of Hawai'i. The contract is between the US Army Garrison, Hawai'i (USAG-HI) and The Cooperative Ecosystem Studies Unit, University of Hawaii. This report specifically addresses projects outlined in Section 5.b.(1-10), Cultural Resources Management.

The Scope of Work (SOW) was implemented to conserve, protect and enhance the natural and cultural resources in the State of Hawai'i as well as to comply with all applicable Federal and State laws and regulations while also improving the US Army's ability to conduct and maintain military readiness. . Implementation of the SOW was achieved through close coordination with and guidance from the U.S. Army archaeologist at PTA. In order to obtain this goal and ensure that proper management measures/decisions are implemented, a better understanding of the natural and cultural resources of the State of Hawai'i must be achieved.

The period of work represented in this report is from July 1, 2005 thru June 30, 2006.

The project consists of inventory survey, site identification, site monitoring, database management, site relocation, maintenance of a curation facility, implementation of monitoring schedules and various other duties performed under the SOW in support of the Army's mission.

All Cultural Resource Management Projects are designed to meet the following requirements:

- Section 106 of the National Historic Preservation Act and associated Codes of Federal Regulations
- Archaeological Resources Protection Act (ARPA)
- Native American Graves Protection and Repatriation Act (NAGPRA).
- Army Regulation AR-200-4

The accomplishments of the 2005-2006 year related to the Scope of Work are summarized here. More detailed discussions of specific activities that document the steps taken toward accomplishing the goals set out in the SOW are contained in the series of reports that make up the remainder of this document. The topics discussed here, as indicated in the Scope of Work, include the results of Archaeological Sensitivity Area monitoring, a summary of fieldwork carried out by the PTA CRM staff in areas controlled by the Army, a summary of public outreach work, a summary of improvements to and progress in the curation process, and construction and improvements made to the GIS database and the PTA CRM database. Two projects begun during this reporting period resulted in reports that are too long to be included as part of this. These reports are available upon request from the PTA CRM staff.

ENVIRONMENTAL AND HISTORICAL BACKGROUND

Most of the work reported herein was conducted at the Pōhakuloa Training Area in the center of Hawai‘i Island (Figure 1). Elevations for PTA range between 4060 feet (1,238 m) to 8,880 feet (2707 m) above sea level (Shapiro and Cleghorn 1995:4.) The climate is relatively cool and dry. Average temperatures range between 50 and 60 degrees Fahrenheit (Hommon and Ahlo 1982:10.) Although rainfall is relatively low (between 100 mm to 400 mm [4 to 16 inches]), moisture, especially on the eastern range, is observed by the occurrence of fog and mist. During the winter months, PTA may experience an occasional frost (Hommon and Ahlo 1982). PTA is covered by lava flows of *pāhoehoe* and *‘a‘ā* derived from Mauna Loa and Mauna Kea Volcanoes (Hommon and Ahlo 1983:7). A majority of the lava flows that cross through PTA are prehistoric lava flows derived from the Mauna Loa volcano and date from 200-400yr B.P. up to 10,000yr B.P. Mauna Kea lava flows represent a small portion of PTA lands limited to the northern portion of the training areas. These flows are more than 10,000 yr B.P. There are several recent historic era flows that originated from the Mauna Loa volcano and cross through parts of the Training Area lands. The lava flows that date to 1843, 1899, and 1935 are located on the eastern portion of the Training Area. The 1859 lava flow is the only historic lava flow on the southwest section of PTA. Soils are generally shallow at PTA and are often comprised of loamy sand, silt loam, and fine sand derived from eluvial volcanic ash and cinder deposits.

Today, PTA vegetation is primarily classified as a sparse, open, or intermediate *‘Ohi‘a* (*Metrosideros collina*) tree land with sparse to dense shrub understory and some isolated communities of *naio-māmane* scrub woodland vegetation. The *naio-māmane* community includes grasses (e.g., *Eragrostis* sp.), low shrubs (e.g., *Chenopodium oahuense*), *‘a‘ali‘i* [*Dodonaea viscosa*], and scattered trees (e.g., *naio* [*Myoporum sandwicense*]). The invasive fountain grass (SP) is becoming more prevalent across the area.

Wildlife in PTA is dominated by introduced feral species. The pig (*Sus scrofa*) and dog (*Canis familiaris*) were originally brought to the Hawaiian Islands by the prehistoric Polynesian settlers. The modern feral pigs and dogs are descended from animals that interbred with European introduced pigs and dogs. Other feral species that were introduced historically to Hawai‘i from the Old World and now run free at PTA include sheep (*Ovis aries*), goat (*Capra hircus*), cat (*Felis catus*), mongoose (*Herpestes auropunctatus*), black rat (*Rattus rattus*), and house mouse (*Mus musculus*). Birds in PTA include many native and introduced species. Non-native bird species observed at PTA include several taxa of introduced gamebirds such as chukar (*Alectoris chukar*), Erckel’s francolin (*Francolinus erckelii*), California quail (*Callipepla californica*), Kalij Pheasant (*Lophura leucomelana*), Ring-necked Pheasant (*Phasianus colchicus*), and turkey (*Meleagris* sp.). Other non-gamebird taxa include the skylark (*Alauda arvensis*), melodious laughing thrush (*Garrulax canorus*), red-billed leothrix (*Leothrix lutea*), Japanese white-eye (*Zosterope japonicus japonicus*), northern cardinal (*Cardinalis cardinalis*), and the house finch (*Carpodacus mexicanus*; Welch 1993:16). Native birds include the migratory *kōlea* (American golden plover, *Pluvialis fulva*) as well as *‘io* (Hawaiian hawk, *Buteo solitarius*), *pueo* (Short-eared brown owl, *Asio flammeus sandwicensis*), *palila* (*Loxioides bailleui*), *‘apapane* (*Himatione sanguinea*), *‘i‘iwi* (*Vestiaria coccinea*), *‘elepaio* (*Chasiempis sandwichensis*), and *‘amakihi* (*Hemignathus*

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virens). Although the Hawaiian Petrel (*Pterodroma sandwichensis*), 'alalā (Hawaiian crow, *Corvus hawaiiensis*), nēnē (Hawaiian Goose, *Branta sandvicensis*), and at least one species of rail (*Rallidae spp.*) once dominated the landscape, these taxa are no longer commonly seen in the area (Moniz Nakamura 1999). Nēnē are becoming more common again at PTA (Lena Schnell, personal communication 2007).

At the time of European contact, the area that encompasses most of PTA lay in the *ahupua'a* of Ka'ōhe, Hāmākua District (Cordy 1994:105). Portions of four ancient districts (Hāmākua, Hilo, Kona, and Kōhala) cross the PTA region. PTA is remote from the general island wide pattern of dense lowland settlement, being some 27 air-miles west of the coastal town of Hilo and 18 miles east of Kailua-Kona. Since there was never a permanent Hawaiian settlement in the Saddle region due to the inconducive sub-alpine environment, traditional Hawaiian agricultural systems of dryland taro or sweet potato were not adapted to this area. However, archaeological studies in PTA and neighboring areas demonstrate that this upland plateau was nevertheless utilized by Hawaiians in prehistory for various types of resource acquisition.

Radiocarbon dates indicate that the Saddle region was used by Native Hawaiians for more than 1,000 years, from ca. A.D. 775 to the nineteenth century, with the most intense use of the Hawai'i Island uplands extending from A.D. 1200 to 1600 (see Roberts, Brown & Buffum 2004 for a recent summary).

Despite the remote location from the area from the foci of settlement, PTA is surrounded by a number of highly significant sites. Located approximately 5 miles west of the post on the slopes of Hualālai, Ahu a 'Umi Heiau is the closest known large *heiau* to PTA.. Traditional accounts state that the *heiau* was constructed in commemoration of the unification of Hawai'i Island by chief 'Umi a Liloa around A.D. 1600 (Hommon and Ahlo 1983:23; Kirch 1985:179). The importance of this *heiau* site lies in its embodiment of the actions of the chiefly ruling class and their effects on regional land use patterns and resource exploitation. To the northeast of PTA on the upper slopes of Mauna Kea, at elevations ranging from approximately 8,600 to 13,000 feet, is the Mauna Kea Adze Quarry Complex, covering an area in excess of 7.5 square miles. Within this extensive area are large site complexes as well as smaller clusters and isolated site locations. Located just northeast of the PTA Cantonment on the lower slopes of Mauna Kea below the main adze quarry are Hopukani, Waihu, and Liloe springs. Associated spring sites evidence basalt tool manufacturing activities and subsistence items specific to different elevations (McCoy 1986).

Following European contact, a number of changes took place in the land use associated with the Saddle area and PTA more specifically. Adze and other stone tool manufacture appears to have ceased relatively quickly as metal became available through trade. Even during the first visit of Capt. Cook, metal was noted among the Hawaiians. Cattle given to Kamehameha I by Vancouver were released into the uplands of Hawai'i Island and were placed under *kapu* restrictions so that the herd would grow. These cattle became feral and impeded use of the uplands. The cattle also changed the nature of the upland vegetation, trampling what plants they did not eat (Maly & Maly 2002: 150). Residents of the island in the 19th century had to build walls to protect cultivated plots from feral cattle, and some large walls were constructed to protect entire communities. The

Map removed to protect rare resources. Available upon request

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managed by ranches, and sheep and goats were introduced. Walls and other features for animal control were constructed in the uplands and across the Saddle region, and supporting infrastructure (watering structures, shelters for animals and humans, etc.) was built across the area. The cantonment area of PTA itself was built in 1956.

The archaeological remains found across PTA demonstrate the use of this area throughout human occupation of the island. Archaeological sites found across PTA include chill glass quarries where volcanic glass was obtained, excavated pits, lava tube habitation and water collection sites, and shrines. These sites and the physical remains found in them demonstrate the variety of activities that took place in the Saddle region prior to European contact. The walls and other remains of the ranching era are the legacy of the historic era use of the area.

The scope of responsibility for the PTA Cultural Resource program has expanded spatially recently. The U.S. Army acquired a parcel of land to the north of the training area in the Saddle, referred to as the Ke'āmuku parcel in the Waikōloa Ahupua'a of South Kohala District. This 22,675 acre parcel of land was formerly used as ranch land by the Parker Ranch. Elevation on this parcel ranges from 2,600 feet to 5,600 feet above sea level. The parcel is made up of grasslands with deep soil and rock outcrops, from north to south: Puu Pa extremely stony very fine sandy loam (PVD), Waikoloa very fine sandy loam (WLC), Kilohana Loamy fine sand, Waimea very fine sandy loam, in the central portion small areas of Kaimu extremely stony peat and Kamakoa very fine sandy loam surrounded by PVD and WLC. The southern portion of the parcel includes Kilohana loamy fine sand, Puu Pa extremely stony very fine sandy loam, Waikoloa very fine sandy loam, Very stony land, Waimea very fine sandy loam, Kaimu extremely stony peat, and lava flows with no soil development. All are well-drained soils. The Kaimu series are thin organic soils over a'ā lava; the remainder are formed in volcanic ash (Sato *et al* 1973). These are based primarily on Hamakua and Laupahoehoe Volcanics derived from Mauna Kea eruptions (Wolfe & Morris 1996). Cinder and scoria cones are found across the parcel. The area receives around 25 inches of rain each year. The Ke'āmuku parcel was grazed for many years by the cattle of the Parker Ranch, and the vegetation of much of the parcel, which largely consists of grasses, reflects this.

Historic properties are distributed across the Ke'āmuku parcel. These properties include mounds, walls, remains of ranching activities such as fencelines and a sheep station, petroglyphs and pictographs, rockshelters and lava tubes, terraces, enclosures, cairns, C-shaped structures, an historic road, and apparent evidence of public works. The remains span the pre-Contact through the early 20th century time periods. The area does not appear to have seen dense settlement nor intensive agriculture during the pre-Contact period, although it is closer to areas that were densely populated and intensively cultivated than the rest of PTA. A succession of livestock related activities took place in the area probably starting with the introduction of cattle, which became feral, in 1793 (see Escott 2004; Maly & Maly 2002). Sheep farming was developed in the area in the 1850's, and cattle ranching was developed by the Parker Ranch by 1907. Government activities took place across the landscape, including surveying, road construction, and U.S. military training beginning in World War II.

Beyond the addition of the Ke'āmuku parcel, the PTA CRM staff is responsible for managing cultural resources at Kilauea Military Camp in Ka'u District, Keaukaha

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Military Reservation Resource Center Building in South Hilo District, and Kawaihae Military Reservation in South Kohala District. Keaukaha Military Reservation Resource Center Building is set on Papai extremely stony muck, and the area is generally landscaped and leveled. Most of the area is grassy and open. Kawaihae Military Reservation is located on the constructed dock, with no soils or vegetation. It has been used since World War II.

Kilauea Military Camp (KMC) is a 50 acre parcel on the north rim of the Kilauea crater in Hawaii Volcanoes National Park in the 'ili'āina Keauhou of Ka'u District at 4000 feet above sea level. The camp is landscaped with grass and a number of trees. Most of the soil is Heake very rocky sandy loam, with a finger of Manu silt loam at the northeast corner of KMC. The landscape is dominated by the recent volcanics of Kilauea, and earthquake cracks are found across KMC. KMC lies at the edge of the montane rainforest environment, with most of the area around KMC consisting of open 'ōhi'a forest with tall grass and a creeping fern (*Gleichenia linearis*). Temperature varies little, with highs in the low 70 degrees F and lows generally in the lower 60 degrees F, though dropping to around 40 F in the winter. Prehistoric land use of the area was probably related to the forest resources found in the area, including bird catching and canoe making. Western visitors have been fascinated by the volcano since the early 1800's and have visited continuously since at least 1822. For a brief period of time (about 40 years), *pulu* was harvested from *hāpu'u* fern (*Cibotium glaucum*) in the vicinity of KMC for sale abroad. Ranching was established to the north of KMC in the early 20th century, and probably affected vegetation in the area. The National Park was officially established in 1921. Military activity at KMC began ten years earlier, in 1911, although the idea of establishing a permanent camp was abandoned in 1915, only to be revived in 1916. A deed for the camp was drawn up in that year; the camp was to be for training National Guard troops and for Army and Navy recreation. The camp was closed when the U.S. declared war on Germany in 1917. In 1921 the Army took control of the camp in an agreement with the board of trustees, when it was used as a vacation locale for soldiers, and was staffed by the Army. By 1930 there were 42 Army buildings at KMC and a regular staff. The camp was self-sufficient except for fuel and food. In 1925 a 14 acre portion of the camp was set aside for the Navy, which officially opened its Naval Rest and Recreation Camp at Kilauea in 1926. During the 1930's, other buildings were constructed, including a hospital, bakery, barber shop, stone cabins, building improvements and improved water catchment systems. The lease with the National Park was renewed in 1936 for 20 years, but this resolution had been slow in coming after the lease expired in 1935 and resulted in the Navy camp closing. The Navy gradually withdrew and transferred sole control to the Army. After the attack on Pearl Harbor in December 1941, recreational activities at KMC were cancelled and it served for a time as the Army Headquarters on Hawaii Island. After June 1942, KMC was re-activated as a rest and relaxation camp. Japanese aliens from Hawaii Island were interned at KMC, until the summer of 1942 by which time all had been sent to Oahu or the U.S. mainland. In 1944 a prisoner of war function was added to KMC. As many as 140 prisoners of war remained at the end of the war, from Korea and Okinawa. All returned to their home countries at the end of the war. Various improvements were made to existing buildings during this time. Following the completion of war damage repairs in 1946, the Army garrison force on Hawai'i Island was closed down, and U.S. Army presence on the island

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was concentrated at KMC, the Army Engineer office in Hilo, and operations at the General Lyman Field and the Army Port. In 1949 KMC became a subpost of Fort Shafter on Oahu. Some new cottages, a new paint shop and a small warehouse were built, and other existing buildings were refurbished or remodeled. In 1950, with the beginning of U.S. involvement in the Korean War, KMC was put on standby status. It was reactivated in 1951, again put on standby status in 1952, and reactivated ten weeks later. Several new buildings and a baseball field were completed by December 1952. Extensive renovation of camp facilities began in March 1956. In 1960 a portion of land on the north side of KMC was exchanged for land on the east side of the camp for the new by-pass highway. The highway covered the camp's garbage dump, which was a large earthquake crack. Renovations have continued over the years to maintain the buildings and compete with other hostels, but little new construction has taken place. A portion of KMC has been determined to be eligible for nomination to the National Register as a historic district.

CULTURAL RESOURCES PROGRAM

The Cultural Resources Program at PTA continues to contribute data that increases understanding of the past uses of the region, as well as managing the resources at all installations so that they may be preserved for future generations. The remainder of this summary discusses the progress that has been made under the various sections of the SOW toward the established goals. The discussion here is a general summary of the work that was done; more specific information can be found in the reports included in the subsequent section under the corresponding heading.

The Scope of Work specifies topics to be covered in the Annual Report, which reflect the focus of activities during the year by the PTA CRM staff. These topics include monitoring of archaeological sensitivity areas (ASA); other fieldwork carried out at PTA, Kilauea Military Camp, Keaukaha Military Reserve, Kawaihae Military Reservation, and the West PTA Acquisition Area, also known as the Ke'āmuku Parcel; public outreach; improvements to and progress in the curation facility at PTA; and construction and improvements made to the GIS database and the PTA CRM database. The remainder of this section of the report summarizes accomplishments in each area during the reporting period, and any recommendations made as a result of the work.

Archaeological Sensitivity Area Monitoring Program:

Monitoring of archaeological sensitivity areas was carried out through most of the 2005-2006 fiscal year. The reports of each monitoring episode are included below. Monitoring activities took place in seven (7) archaeological sensitivity areas (ASAs) during this time period. Monitoring in four of these areas (4, 26, 30 and 31) was completed and resulted in the generation of a monitoring report summarizing findings and recommendations.

Monitoring occurred in the course of other field work activities in two ASAs (2 and 18). The work in these two areas is discussed here in terms of the conditions noted at the sites in the ASAs, but the details of the fieldwork is found in the next section, other fieldwork. Finally, monitoring activities were begun in ASA 5 during the time period reported on in this report but not completed. Therefore, no report has been generated for this ASA. A detailed summary of the work completed is included however.

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ASA 4 consists of one archaeological site, site 50-10-31-19490, which is comprised of many features. The features include several lava tubes that have been used for shelter, trails, and cairns. Monitoring at the site during the period covered by this report consisted of obtaining GPS points, placing site and feature washers in appropriate locations, completing monitoring forms for each feature, and photographing each feature. Plan maps were drawn where none existed, and site descriptions were updated. There were eleven (11) known features prior to the project, and four (4) new features were identified during the fieldwork. Ungulate activity was documented across most of the site, particularly at features A, B, C and E, ungulate trampling was noted at features A and E, and bones were present at features A and C. Garbage was present at Feature E, and exploded ordnance was noted at Feature F. Monitoring values of 1 (yearly or after training) were recommended for ten of the features, values of 2 (every other year or after training) were recommended for five features and the cairns associated with Feature K, and a value of 3 (occasional monitoring) was recommended for the newly identified trail due to uncertainty about its origin. Recommendations were made to modify the ASA 4 boundary to accommodate the newly identified extent of Feature F.

ASA 26 originally incorporated one habitation site (Site 50-10-31-23456), and part of a large site of excavated pits distributed across two training areas (Site 50-10-31-23455). Site monitoring included confirmation of the coordinate data for site 23456, completion of monitoring forms, and photographing the site to complete baseline site condition information. Ungulate scat was noted at this site. A monitoring value of 1 (yearly or after training) was assigned to this site. The boundaries of ASA 26 were revised to include only site 23456.

ASA 30 originally encompassed three archaeological sites (Site 50-10-31-23450, 23451 and 23452). All sites had been identified by Garcia and Associates (Roberts, Robins & Buffum 2004), but were subsequently dropped after re-examination during Phase II testing and evaluation (Robins & Gonzales 2006) and the site numbers re-used in another project at PTA. The PTA-CR staff monitoring confirmed that none of these locations include any historic properties. Two additional locations of interest were noted in the course of the monitoring: a natural sink and associated shelters and lava tubes lacking any evidence of cultural activity; and an area of recent military activity. Based on the information gathered during this monitoring activity, it was recommended that ASA 30 be dropped from the ASA list.

ASA 31 originally consisted of a single site, 50-10-31-23457, a trail with two associated cairns. Monitoring activity included collecting GPS data for all features, placing site and feature washers where appropriate, taking photographs, and completing monitoring forms. Two new cairns were identified during this work, and were documented to the same level as the other features. Several military features were also located during the work in this area and recorded for future tracking. Monitoring identified goat scat at the sites. Recommendations included monitoring the trail feature of site 23457 yearly or after training, and the inclusion of three sites to the west as satellite locations of ASA 31. These sites included excavated pits, or pāhoehoe excavations, a cairn, and a low stone wall. Ungulate scat was noted at three of the sites (23457, 24326, and 24327), and shell casings and garbage were noted near 24328. The recommendation was made to monitor these sites yearly (23428) and every other year (23426 and 23427), or after training.

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Monitoring work was started on portions of ASA 5 during the 2005-2006 year, but was not completed. Seventeen sites were visited (50-10-31-5002, 23570, 21351, 21744, 22941, 23573, 23568, 23565, 23563, 23564, 23572, 23566, 21745, 23569, T-021402-1, T-020702-2, T-070404-1, and T-010705-1). The sites included habitation sites (both structures and in lava tubes), resource procurement locations (lithic quarries), and artifact scatters. Additional work is necessary to complete monitoring on all sites within this ASA. Indications of disturbance to the sites included ungulate scat, bones, trampling, garbage, and ammunition casings.

Several other projects included archaeological observation of sites within two additional ASAs, 2 and 18. Archaeologists accompanied biologists working on a project to identify *Asplenium fragile* in lava tubes. Four lava tube sites were visited in ASA 18 during this project. Heavy disturbance to a terrace at the entrance of 50-10-30-10267 was noted, probably created by ungulates. The remainder of the site appeared to be in good condition and not damaged. Ungulate damage was not prevalent at Site 50-10-30-10268. A trail site was relocated, site T-010705-1; additional work is necessary to provide baseline site condition data for this site. Site 50-10-30-10271 was relocated, but at the opposite end from the open entrances; therefore the condition of this site was not assessed. Site 50-10-30-10272 was visited; no mention is made of disturbance to the site, but *A. fragile* was located indicating that the lava tube has not had much visitation by ungulates.

ASA 2 monitoring took place in the course of the caving project. Site washer was placed at site 21165A, 21165B, 21165C, 21165D, 5004, 5004A, 5004B, 5004C, 5004D. A new site, a cairn, site T-020106-1, was located and GPS coordinates recorded for it. GPS coordinates were also recorded for the site washer locations.

The most consistent type of disturbance to archaeological sites noted during this year was due to ungulates. In some cases steps have been taken to protect sensitive sites from future disturbance; the Natural Resources program of the DPW Environmental Office is also attempting to remove ungulates from the training areas to protect endangered plants. Some human refuse was also noted in the vicinity of some sites. Recommendations for the future include scheduling the proposed return visits so that they are carried out on a regular basis (for example, none of the sites in ASA 12 with values of 1, annual monitoring, were revisited during this year), and better coordination with Range Control to ensure that monitoring after training exercises takes place. Field work to bring the information about sites within two ASAs, 5 and 34, to baseline level remains to be completed, and 26 other ASAs remain to be brought up to baseline data level.

Archaeological Fieldwork by PTA CRM Staff:

Several other projects requiring archaeological field work were conducted by PTA CRM staff. The field work related to locating *Asplenium fragile* was coordinated between the Natural Resources and Cultural Resources staff. The objective of the survey project was to document the presence of *A. fragile* in various lava tubes. Archaeologists accompanied biologists on this project to ensure that cultural resources were not disturbed, and information about cultural resources at these locations was recorded.

An effort emerged from the work in ASA 5 to document the entire length of site 23452. The site stretches across the entire PTA area. Work on this project was not completed during the 2005-2006 reporting period. GPS points were recorded for each fence post and

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for additional features apparently associated with the fence line. Details of the project are contained in the Trip Reports included below.

Experienced cavers were brought on as temporary hires to map some of the caves on PTA. Between December 6, 2005 and March 8, 2006, three lava tube systems were mapped in detail and archaeological remains within them were noted. The three systems included the Bobcat Trail Cave (System E), the Delta System, and the lava tube system at Pu'u Koli, also called the N system. A total of 19,443.8 feet (5926.5m) were surveyed in caves during the field season. In the Bobcat Trail, or E, System, 2,683.3 m were surveyed. Archaeological findings included piled sticks, the mandible and cranium of a domestic cat, charcoal scatters, bird bone concentrations, torch butts, burnt grass, and gourd fragments. Previously identified archaeological sites were relocated during this project, including 21164 (A-C), 5004, 5004A, B & D, and additional information was recorded about sites 5004 B and D. Survey in the Delta system recorded 2183.9 m of lava tube system, and documented archaeological remains including stone rings or gourd cradles, charcoal scatters and concentrations, torch butts, speleotherm caches, and some charcoal associated with natural water holes and some breakdown areas. The cave survey in the Pu'u Koli area documented 1059.3 m of lava tube system, and documented a built step that provided better access to the system. Three experienced cavers were brought on as temporary hires for this project, and 20 volunteers participated.

The PTA CRM staff conducted an extensive survey of the proposed fire access route and fence line along the western boundary of PTA. Trail 19528 had been previously documented by Shapiro & Cleghorn (1998) during an aerial survey. Two platforms were noted during this survey with long axes parallel to the trail. Eleven trail segments were recorded with a Trimble GPS unit during the current project on 'a'ā lava. The trail was not obvious on pāhoehoe flows between the documented segments, although Shapiro & Cleghorn note that there was at least one segment over pāhoehoe that appeared worn from the air (1998:87). The total length of the segments documented was 3.07 km, while the distance covered during the project was about 5.08 km. An additional 180 features were recorded during this project along the trail, including cairns, lava tubes, platforms, lava blisters, rock shelters, C-shape enclosures, enclosures, wall segments, terraces, an early historic camp site, and several isolated artifacts. The full report is not included in this Annual Report; it is available upon request. The proposed fence line and fire access route were designed to avoid these historic properties.

Trail 5007 through 'a'ā was recorded with a Trimble GPS unit. Three cairns, or *ahu*, were also recorded beyond the southern end of the trail on the 1859 flow, on *pāhoehoe* lava.

Several construction monitoring projects took place during the reporting period that required archaeological monitoring. These included cesspool monitoring at Kilauea Military Camp (KMC) and septic tank placement at Pōhakuloa Training area. The project at KMC involved the relocation of cesspools through excavation of shallow soils and subsequent testing of the cesspools. Seven cesspools had been relocated prior to the arrival of the archaeological monitor. Seven others were located during monitoring, and two could not be located during this project. Abandoned utility lines were located in several of the excavations. An apparent historic trash dump was located near Cesspool 9. Artifacts identified in this area included a Bayer aspirin bottle that matches one found in

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a 1935 advertisement, a metal support, and a broken ceramic handle. The artifacts were photographed and returned to their place of origin. No other cultural materials were encountered during this project. Cesspools were replaced with septic tanks at PTA. No cultural materials were noted during these excavations.

The PTA CRM staff conducted a Phase II archaeological investigation in Training Areas 1, 3 and 4. The fieldwork for this project was begun during the reporting period of this report, but was not completed until the 2006-2007 fiscal year. Therefore, this project will be reported on in the 2006-2007 Annual Report.

Public Outreach :

The PTA CRM staff hosted about 12 children each day on June 30 and July 13, 2005 from the *'Imi Pono no ka 'Aina* program. The participants received orientation in the Interpretive Garden and the Curation Facility. They then proceeded to archaeological sites to discuss interpretation of observations, used a GPS to find known sites, and placed site washers and protective barriers at sensitive archaeological sites.

Curation Facility:

All of the 82 boxes in the PTA Curation facility were fully accessioned, totaling 6,033 entries as of June 2006. Materials from eight archaeological projects were inventoried and entered into the database between July 2005 and June 2006, consisting of seven Ogden projects and the UH Manoa archaeological field school of 1997. The curation facility houses two fireproof metal cabinets that contain sensitive materials organized into major source material groups: plant (botanical), stone, wood, bone, shell and historical. The botanical material is further subdivided. Weekly maintenance and curatorial processes are maintained and conducted as needed. Steps have been taken to ensure that the climate in the curation room is satisfactory. Metal curation quality cabinets were installed, machinery removed, and tours reduced to protect the artifacts and any documents that require climate controlled conditions. The climatic conditions at PTA are relatively dry and cool. Humidity and temperature in the curation facility are monitored with a hygrothermograph, and average 40-55% and 60° F, respectively.

A Bulk Sample (BS) Collection was created to differentiate the larger less sensitive soil/organic samples from the individual delicate artifacts and to make for a more efficient use of space in the facility and particularly in the curation cabinets. The collection now houses 163 bulk samples from various projects. Samples were sifted through 1/8 inch screen and extracted artifacts remain in the curation facility while the sterile matrix is moved to Quonset Hut T-284. The bulk sample collection is expected to double by the time the curation cabinets are filled and the collections are permanently housed.

Two display case exhibits were developed, one at Headquarters and one in the Environmental Office conference room. The artifacts used in these displays are monitored regularly for signs of deterioration. Some artifacts are displayed in photographs only as they are too fragile to include in the display cases.

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The last human bone in the PTA curation facility was repatriated during this reporting period. A human humerus from an Ogden project that was associated with a 1000 B.P. date, and therefore most likely Native Hawaiian, was excavated from a lava tube and originally misidentified as an animal bone. The *iwi* was repatriated and reburied in April 2006 by Kaumakaiwa “Lopaka” Kanaka‘ole Kanahale and Eddie Aiau in accordance with NAGPRA guidelines and Traditional Hawaiian protocol. Following this action, no human remains are contained within the PTA curation facility collections.

Based on the work carried out during this reporting period, recommendations were made to continue the work of moving artifacts into the Museum cabinets, assess the need for additional cabinets, and to continue the processing of bulk samples and their removal to T-284. A recommendation is also made to work with the Anthropology Department at UH Hilo to employ interns or volunteers to assist with the curation duties.

Archaeological Site Inventory Database And GIS/GPS Program:

Work on the Geodatabase built on and improved previously developed spreadsheets for data input. User feedback was incorporated, resulting in a combined spreadsheet from what had previously been separate small spreadsheets. The GPS units and GIS program were developed as data input methods. A survey data application, Compass, was explored as another way to enter data into the Geodatabase. Data input was also developed through a digital photo program, although only one machine was able to run this program. Work continued on the CR_PTA.mdb database to produce a query form to search for data in any way a user might specify.

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CULTURAL RESOURCES PROGRAM AREAS

ARCHAEOLOGICAL SENSITIVITY AREA MONITORING

Monitoring of ASA 04

Archaeological monitoring of ASA 04 located in the north central portion of Pohakuloa Training Area, was performed on July 21, 22, 27, and August 3 & 4, 2005. James Head, Kelly Luscomb, & Cary Stine, PTA Cultural Resource Specialists participated in the monitoring project. A total of 56 person-hours were expended.

There was one known archaeological site within the current boundaries of ASA 04 (Figure 1). It was recorded in early 1993 by BioSystems Analysis, Inc. (BioSystems) for the U.S. Army Corps of Engineers (COE) with funding from the Legacy Resource Management Program of the U.S. Department of Defense (Contract No. DACA83-91-D-0024, Delivery Order 0012) (reported in Shapiro & Cleghorn 1998).

Further testing of Site 50-10-31-19490 was performed by GANDA (Garcia and Associates) in early 2003 also for the U.S. Army Engineer District, (CEPOH-EC-E) for the Proposed Training Areas for the Stryker Brigade Combat Team, U.S. Army Pohakuloa Training Area, Island of Hawaii, Hawaii (Contract No. DACA83-01-D-0013, Task Order 0007; reported in Roberts, Robins & Buffum 2004).

Site 50-10-31-19490 was subjected to Site Protection Activities in the latter part of 2003 by the Cultural Resources team, Pohakuloa Training Area. During this visit, a Concertina (Razor) Wire barrier was placed in the entrance of Fea. C, a habitation cave at the site. The barrier was placed to deter ungulate access into what are thought to be intact cultural deposits located within the cave. Prior to the wire placement, an intact pair of kī leaf (*Cordyline terminalis*) sandals were collected and removed to the Curation Facility at Pohakuloa Training Area.

Site 50-10-31-19490 was relocated by the current team and documented. This documentation includes accurate GPS location for all features and the placement of Pohakuloa Training Area-Cultural Resources (PTA-CR) permanent site/feature washers. PTA-CR Monitoring Forms and photographs were completed to establish baseline site conditions. Numeric values (below) were established for each of the known features of Site 50-10-31-19490 as well as the newly discovered features.

In addition to the eleven known features (A-K) at Site 50-10-31-19490, four new features (L-O) were recorded. A new portion of trail at Fea. F, a possible intra-site trail between Fea. E & Fea. C, and twelve cairns (*ahu*) marking the route of Fea. K trail were located, and all features were recorded to the same level.

After site monitoring at ASA 04, the following values were assigned to the features within Site 50-10-31-19490:

Table 1. Monitoring Values at Site 50-10-31-19490.

Site 50-10-31-19490 Feature	Monitoring Value
A	1
B	1
C	1
D	1
E	1
F	1
G	2
H	2
I	2
J	2
K	1
Fea. K – Cairn #0 - 11	2
L	1
M	1
N	1
O	2
Possible Trail Between Fea. E & Fea. C	3

Because the new mapping of the Fea. F (trail) route is outside of the current ASA boundary, it is suggested that the ASA boundary be slightly modified by increasing it to the west so that it will include the new portion (Figure 2). Continued monitoring of all features with a “1” value [Features A, B, C, D, E (caves), F, K, (trails) L, M, & N (lithic scatters)] will need to be monitored yearly or whenever the area is utilized for training. Those features with a “2” designation [Features G, H, I, J (cairns), O (modified outcrop), & K (Cairn #0 – 11)] are recommended for monitoring every other year or whenever the area is utilized for training. The single feature with a “3” designation (Possible Trail Between Fea. E & Fea. C) will only need occasional monitoring. This is based upon the thought that this may be a goat or sheep trail, since the area is heavily utilized by feral ungulates. No features were assigned “0” designation, as all known features were relocated.

Monitoring of ASA 26

Archaeological monitoring of ASA 26 located in the northeastern portion of Pohakuloa Training Area was performed on October 20, 2005. Glenn Escott, PTA Senior

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Cultural Resource Specialist and James Head, PTA Cultural Resource Specialist participated in the monitoring project. A total of 16 person-hours were expended.

There was one known archaeological site within the current boundaries of ASA 26 (Figure 1). It was recorded in early 2002 by Garcia and Associates (GANDA) for the U.S. Army Corps of Engineers (COE) with funding from the SBCT Battle Area Complex (BAX) of the U.S. Department of Defense (Contract No. DACA83-01-D-0013, Task Order 0007).

Sub-surface testing of Site 50-10-31-23456 was performed by GANDA (Garcia and Associates) in early 2003 also for the U.S. Army Engineer District, (CEPOH-EC-E) for the Proposed Training Areas for the Stryker Brigade Combat Team, U.S. Army Pohakuloa Training Area, Island of Hawaii, Hawaii (Contract No. DACA83-01-D-0013, Task Order 0014).

Site 50-10-31-23456 was relocated by the current team and documented. This documentation includes confirming the GANDA GPS location for this feature and the placement of a Pohakuloa Training Area-Cultural Resources (PTA-CR) permanent site washer. PTA-CR Monitoring Forms and photographs were completed to establish baseline site conditions. A numeric value (below) was established for Site 50-10-31-23456.

After site monitoring at ASA 26, the following values were assigned to Site 50-10-31-23456:

Table 2. Monitoring Values at Site 50-10-31-23456.

Site 50-10-31-23456	Monitoring Value
-	1

Since Site 50-10-31-23456 has been assigned a monitoring value of “1”, it is recommended that the site be monitored yearly or whenever the area is utilized for training. This recommendation is given since it appears to be the only traditional Hawaiian short-term habitation feature within this area.

The original ASA 26 boundaries included at least seven Site 50-10-31-23455 locations. Site 23455 was used by GANDA to include all located pāhoehoe excavations within Training Areas 5 & 6. Since these are ubiquitous features throughout the area, they are no included within the boundaries of ASA 26. The boundaries of ASA 26 are now limited to an area surrounding Site 50-10-31-23456 in the northern portion of the old ASA.

Monitoring of ASA 30

Archaeological monitoring of ASA 30 located in the north-central portion of Pohakuloa Training Area was performed on October 19 & 20, 2005. Glenn Escott, PTA Senior Cultural Resource Specialist, James Head and Kelly Luscomb, PTA Cultural Resource Specialists, participated in the monitoring project. A total of 31 person-hours were expended in this project.

There were three known archaeological sites (50-10-31-23450, 23451, & 23452) within the current boundaries of ASA 30. These sites were recorded in early 2002 by GANDA (Garcia and Associates) for the U.S. Army Engineer District, (CEPOH-EC-E) for the Proposed Training Areas for the Stryker Brigade Combat Team, U.S. Army Pohakuloa Training Area, Island of Hawaii, Hawaii (Contract No. DACA83-01-D-0013, Task Order 0007; Roberts, Robins & Buffum 2004).

All three of the sites originally found in ASA-30 were assigned permanent State Site Numbers during the GANDA Phase I survey. All three of these sites (23450, 23451, and 23452) appear to have been dropped after GANDA Phase II work. There is no record of any photography having occurred at the sites, but a GANDA table (Table I Summary of Phase II Work in BAX Study Area; Robins & Gonzales 2006) indicates that testing and detailed mapping took place at Sites 23450 and 23451. Apparently, Site 23452 was adjudged to be "Military" and no further work took place here. No further documentation was available for any of these sites. The site numbers were subsequently re-assigned to other GANDA sites in the Go-No Go area.

Site 50-10-31-23450 was initially recorded as Temporary Site GANDA 600 and consisted of a mound. After testing, with negative findings, the site was dropped by GANDA. After the location was found and examined by PTA-CR, it was determined that the mound/terrace was natural and no further work is recommended at this location.

Site 50-10-31-23451 was relocated by the current team and documented. It was initially recorded by GANDA as Temporary Site GANDA 601 and consisted of a sink. After testing, which returned negative findings, the site was dropped by GANDA. The location was found and examined by PTA-CR, it was determined that the sink was natural with no cultural indications and no further work is recommended at this location.

Site 50-10-31-23452 was initially recorded as Temporary Site GANDA 602 and consisted of an enclosure. Apparently, GANDA did not test or map during Phase II work, but termed the site "Military" and dropped it from the inventory. After the location was found and examined by PTA-CR, it was determined that the "enclosure" was natural and no further work is recommended at this location.

While the PTA-CR team was transiting between the sites, a large sink with a potential entry into a cave system was located. The sink measures ca. 15m (N/S) x 10m (E/W) x 3.0m deep with rock fall and tumble on the west side.

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Openings in the sink include an overhang on the north approximately 2m wide and 2m deep, one on the south that is 6.5m wide and 3.5m deep, with the majority 1-2m deep. It pinches off in back and on the sides and the floor is roof fall covered with aeolian silts. No artifacts are visible on the surface of either overhang, and a dead goat is found in the southern.

Near the center of the sink, there is a short tube traveling an unknown distance to the northeast. The entrance is ca. 1.0m wide and 0.75m high. From the entrance, it drops down about 2m into a chamber with overall dimensions of 5.0 (N/S) x 5.0 x 1.0m high. There are level silts and organic material on the floor of the cave. These deposits are likely the result of solifluction/eolian processes. No charcoal or cultural materials were noted on the surface.

As the team progressed on to the south looking for possible lava tube entrances, a number of aligned vertical posts were located around:

232409m E		232419m E
2184757m N	(Garmin)	2184760m N

These are single boards of planed lumber (1x4") set in rock piles. Actual dimensions are 0.09 x 0.02 x 1.0m high. There are no indications of associated fencing materials, but some of the posts had two placed galvanized roofing nails. Large amounts of MRE foil containers, plastic eating implements, and other military debris was scattered about. This military feature was assigned the number of MT-102005-1. It should be noted that more locations to the east and west of this discovery area should be added as they become available. The new fence posts should not be assigned new numbers, but rather some sub-number of MT-102005-1.

No photographs were taken. These data will be used to in the PTA-CR Database to determine location of present training features.

As discussed above, no prehistoric sites (other than *pāhoehoe* excavations) appear to lie within the boundaries of ASA 30. The military site (MT-102005-1) lies to the south. Neither the *pāhoehoe* excavation nor the military site will require further work in terms of monitoring. It is recommended that ASA 30 be dropped from the list of Archaeological Sensitivity Areas at this time. In the future, if additional prehistoric sites are located within the boundaries, the ASA can be reinstated.

During fieldwork in ASA-31, a number of Recent Military Features constructed during military training were noted. These features were examined, dimensions, and construction were recorded and a Garmin GPS point was taken for each feature or complex of features.

Monitoring of ASA 31

Archaeological monitoring of ASA 31 located in the north-central portion of Pohakuloa Training Area was performed on August 10, 17, 18, 24, & 25, 2005. James Head, Kelly Luscomb, & Cary Stine, PTA Cultural Resource Specialists, participated in the monitoring project. A total of 38 person-hours were expended.

There was one known archaeological site within the current boundaries of ASA 31. Site 50-10-31-23457 was recorded in early 2002 by GANDA (Garcia and Associates) for the U.S. Army Engineer District, (CEPOH-EC-E) for the Proposed Training Areas for the Stryker Brigade Combat Team, U.S. Army Pohakuloa Training Area, Island of Hawaii, Hawaii (Contract No. DACA83-01-D-0013, Task Order 0007; Roberts, Robins & Buffum 2004).

This site was initially recorded as Temporary Site GANDA 616 and consisted of an 'a'ā trail segment and two associated 'a'ā *ahu* or cairns. Total length of the 'a'ā trail (Fea. A) was 98.366m as determined with a Trimble GPS. The site lies on a recent lava flow that is almost completely barren of vegetation and Fea. A is described as being about 1.0m wide throughout. The trail has a crushed/small 'a'ā cobble surface with larger 'a'ā cobbles along the edges.

Site 50-10-31-23457 was relocated by the current team and documented. This documentation includes accurate GPS location for all features and the placement of a Pohakuloa Training Area-Cultural Resources (PTA-CR) permanent site/feature washer. PTA-CR Monitoring Forms and photographs were completed to establish baseline site conditions. Numeric values (below) were established for each of the known features of Site 50-31-10-23457 as well as the newly discovered features.

In addition to the three known features (A-C) at Site 50-10-31-23457, two new features (D-E) were recorded. The new features were two additional cairns which were located and recorded to the same level.

Attempts were made to find additional alignments of the Site 50-10-31-23457 on to the east from the recorded portion. The area to the east is very rough, undulating 'a'ā with numerous goat trails. Three *possible* trail alignments in the area were found and will be located with the Trimble GPS. These are quite indistinct and may be goat trails. It is probable that there was a prehistoric trail connecting the known portion of Site 50-10-31-23457 to Site 50-10-31-19490 (approximately 900m east), but no evidence of this trail is yet known.

Three sites were recently recorded by PTA Cultural Resource Staff in 2004. These sites were found during an archaeological reconnaissance survey of approximately 600 acres in Training Areas 6, 7, and 8, Pohakuloa Training Area (King and Head 2004). Although these sites are located approximately 800-900m west of ASA-31, it is thought that all three should be included in separate portions of ASA-31. More information on these sites is given below:

Site 50-10-31-24326 (Temporary Site T-101204-1) is a complex of three possible prehistoric pāhoehoe excavations.

Feature A is a small pāhoehoe excavation with a low overhang on the south. It appears too small for entry and there is a possible C-shape alignment of large cobbles – small boulders on the north side of the excavated area. Feature B consists of two additional pāhoehoe excavations, both of which measure about 1.0 m² by 0.45m deep. Both appear to have been cleared out with the materials spread to the north, and Feature C is a broken pāhoehoe blister with a possible cleared interior. The hole in the top of the blister measures about 0.70 by 0.40 with the blister about 0.75m deep. This site is consistent with the typology described for bird-catching activities (Moniz-Nakumura, et al. 1998).

Site 50-10-31-24327 (Temporary Site T-101204-2) is a stacked cairn built on mostly level pāhoehoe and measures about 0.95m² and 0.90m high. It is constructed of small cobble to small boulder-size pāhoehoe stones stacked eight to nine courses high. There is another possible collapsed cairn about 2.5m away at 190°. One aluminum arrow shaft was found about 25m to the north, but no other cultural items were located.

Site 50-10-31-24328 (Temporary Site T-101304-1) consists of a low stone wall which bridges a natural lava gap and two associated enclosures approximately 5.0m to the south. A modification of the ridge above the site was also evident and military garbage is present in the vicinity. Site T-101304-01, however, does not appear to be associated with military training activities. Unlike the typical hastily constructed military features, the three features at Site T-101304-01 are built with small to medium boulders requiring a substantial effort to place. No traditional Hawaiian cultural items were found during the reconnaissance, but testing of the interiors of the two enclosures may disclose them.

After site monitoring in ASA 31, the following values were assigned to the features within Site 50-10-31-23457, 24326, 24327, and 24328:

Table 3. Monitoring Values at Sites in ASA-31.

Site 50-10-31-23497 Feature	Monitoring Value
A	1
B	2
C	2
D	2
E	2
Site 50-10-31-24326 Feature	Monitoring Value
A	2
B	2

C	2
Site 50-10-31-24327	Monitoring Value
-	2
Site 50-10-31-24328	Monitoring Value
Feature	
A	1
B	1
C	1

As discussed above, the last three sites are located well to the west of the current ASA boundary. Rather than expanding the western side of the current boundary, it is suggested that new ASA “satellites” be added to ASA-31. A larger one might include Sites 50-10-31-24326 and 50-10-31-24327, and another to include Site 50-10-31-24328. The areas between these sites do not appear to contain cultural resources and need not be included in ASA-31.

Continued monitoring of all features with a “1” value [Site 50-10-31-23497, Feature A and Site 50-10-31-24328, Features A, B, and C) will need to be monitored yearly or whenever the area is utilized for training. Those features with a “2” designation [Site 50-10-31-23497, Features B, C, D, and E, Site 50-10-31-24326, Features A, B, and C and Site 50-10-31-24327 (cairn)] are recommended for monitoring every other year or whenever the area is utilized for training. No features in ASA-31 were assigned a “3” designation requiring occasional monitoring. No features were assigned “0” designation, as all known features were relocated.

During fieldwork in ASA-31, a number of Recent Military Features constructed during military training were noted. These features were examined, dimensions, and construction were recorded and a Garmin GPS point was taken for each feature or complex of features. No photographs were taken. These data will be used to in the PTA-CR Database to determine location of present training features.

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COMPLIANCE FIELDWORK

Archaeological fieldwork took place in support of a number of projects during this reporting period. The field work included archaeological monitoring of construction activities, archaeological survey in proposed project areas, and collection of additional information as needed. The data collected during these projects is presented in this section.

Notes on cave/asplenium surveys

When: December 28, 2005

Who: Aubrey Kelly, Jennifer Taylor, Bill Godby, Glenn Escott

Where: Training Area 23/MPRC

Site T-122805-1

Identified overhang shelter with cultural deposits (Figure 1). Site designated as T-122805-1. It is located at E220152 N2174165. The site measures approximately 8-10m in length with maximum ceiling height of approximately 1m. Artifacts include 2 waterworn/shaped cobbles, likely birdstones, although the shape isn't totally consistent with previous findings (Figure 2). One cobble has a flatter surface than normally seen and is likely an obelisk-shaped hammerstone, a common tool type found at PTA. Two photos were taken by Glenn Escott, 119-1942 (possible birdstones) and 119-1943 (overhang shelter).

Additional cultural findings include a small ahu located directly above the center of the overhang (three platy pāhoehoe cobbles and a subangular small boulder stacked three high), a possible charcoal scatter, and a small rock pile most likely the result of clearing activities.

This site was perhaps used only one time, with no evidence of repeated visitation. Further work includes mapping and possible testing.

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Plate 1. Site T-122805-1 Overhang



Plate 2. Artifacts at Site T-122805-1

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Site 10651

This lava tube has been previously recorded. There appears to be no existing photograph of the one existing feature, a circular firepit. The feature was photographed (Figure 3). There appears to be no impacts to this site other than minimal ungulate activity evidence by feces on the cave floor.

The brass site washer was identified at the site.



Plate 3. Site 10651 Burnt Wood Feature

Site 10648

This site appears as described by Athens/Kaschko and Howarth/Stone, excepting a few details. An opihi shell was identified within the immediate entrance of entrance A. This is not referenced in either report.

Impacts to the site appear limited to moderate ungulate use. Several areas reveal significant pellets on the surface of the cave floor.

The brass site washer was identified upon the overhang of entrance A.

Site T-122805-2

The field crew continued on to the natural resource Intensive Management Unit (IMU) 34. This site is the location of several previously identified populations of *Asplenium fragile*, now known as *Asplenium peruviana*.

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There is no existing recordation of this site and it has been given the site number T-122805-2. The site tag was placed upon the N/E drip edge.

The site is typical of a cave sink, with passages trending in two directions. It measures approximately 12-14m N/S and 8-10m E/W. Entrance A trends NW and Entrance B trends SW.

Entrance A.

The entrance to tube A is roughly 1 to 2 m in height and is almost as wide as the sink (Figure 4). It is partially filled with cobbles and boulders from the roof collapse. Access is gained to the tube by climbing down the 2 m tall rubble pile. There is a 2 m wide by 0.40 to 2 m high overhang along the eastern edge of the sink. Two separate *asplenium* communities, marked with pink flagging tape, are just inside entrance A and under the overhang to the east.



Plate 4. Tube A Entrance View to North

Tube A consists of a main tube approximately 50 m long, 2 to 4 m in width, and 2 to 3 m high, and two smaller tubes that branch off of and reconnect to the east side of the main tube (Figure 5). The roof of the tube is saturated with water and drips. There is a collapse approximately 25 m along the length of the tube and access to the back of the tube can be gained by crawling over the roof fall pile (0.4 m opening). The back of the main tube pinches off. Small bits of charred wood, mostly isolated single pieces were

Map removed to protect rare resources. Available upon request

Entrance B

There are two levels of passages, with the lower level approximately 2 meters north of the upper passage (Figure 5). Both passages are relatively cylindrical/tubular, with ceilings measuring approximately 1.5m in height and about 2.5m in width. Both are accessible without a great deal of effort. The lower tube tends to trend in an overall easterly direction. This passage contains some scattered charcoal, although not an abundance. Small pieces of wood are also seen in this chamber. The tube continues on an unknown distance. There appears a high likelihood that this tube was a source for water due to numerous existing drip areas. Small charcoal scatters were located near these areas. Also, at the beginning of this passage is an easily identifiable ashy area. This would be a good area for testing.



Plate 5. Tube B Entrance View to South

The upper passage enters from the south and also continues east. This section has some charcoal, but less than the other passage. There are also small fragments of wood. The passage appears to pinch off after approximately 50-60 meters.

A small manuport consisting of a driblet spire was located on the surface of this site, within the collapsed tumble. The item was photographed. It is not clear why the item was brought to the surface, but it was clearly from the cave itself, where numerous similar items could be seen. The item was photographed.

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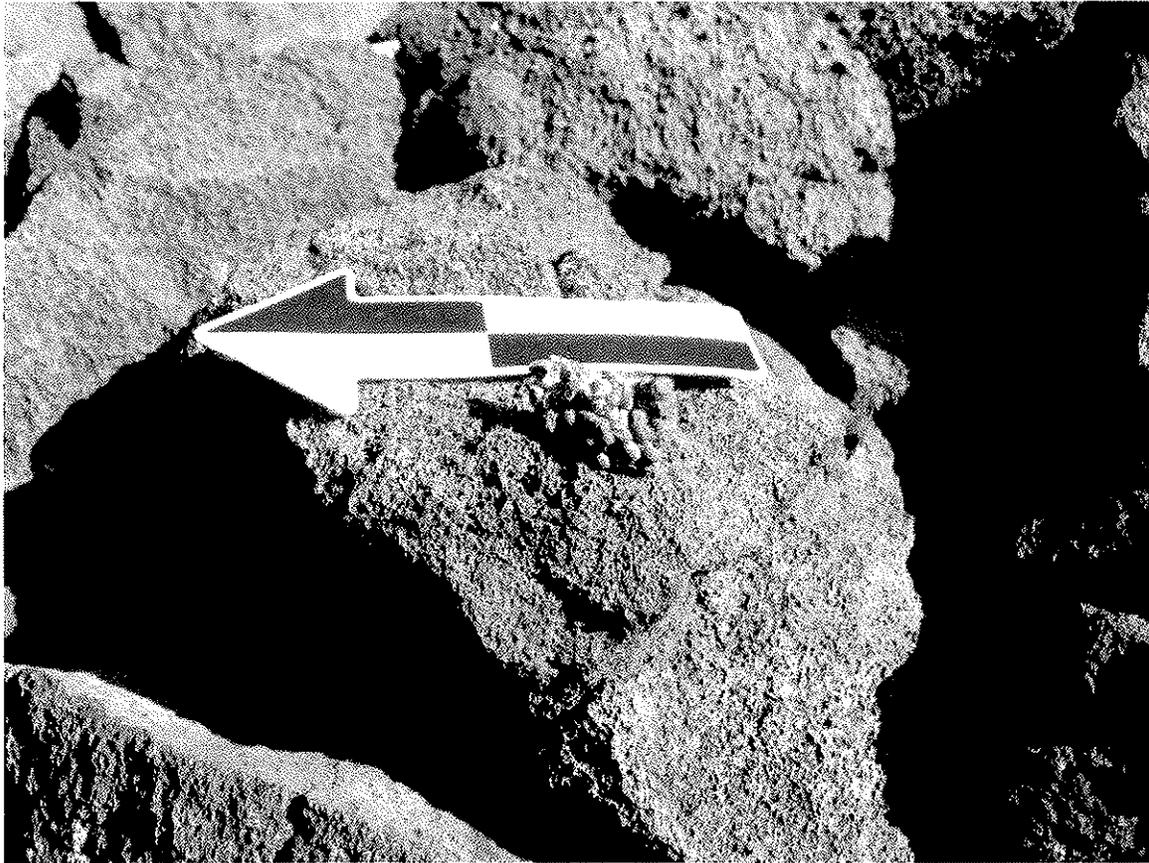


Plate 6. Manuport-Driblet Spire, In-Situ

The group continued on to site T-020402-04. This is a small sink identified from the air. The tube system associated with the sink was not entirely explored and documented during this visit due to time constraints. The sink is on a dark grey pāhoehoe flow surrounded by a younger brown 'ā'a flow. The sink measures approximately 1 m (NW/SE) by 1.5 m and is roughly 2 m above the tube floor. The main chamber is approximately 30 m long and has at least two smaller tubes connected to it. The tube ranges in height and is 2 m maximum. Much of the sink contained small scatterings of bird bone. However, the birdbone was not accompanied by charcoal, making it unclear whether the bone was the result predators such as rat or whether it was in fact cultural deposition. Some of the bird bone in the rear of the main chamber appears to be comprised of complete assemblages, suggesting natural death. No other artifacts were located at the site. Further work is recommended.

The group exited to the cantonment at 1500 hours.

December 5, 2008

Site 23452 project

Date	Crew	Hours	TA	ASA
1/5/2006	GE & JH	14	06	N/A

Site Targets

Site 23452

Located

Site 23452

New Discoveries

N/A

Notes

The crew left the Cantonment at 0900 hrs. and drove to Training Area 06 to locate the fenceposts at Site 23492 (GANDA Ranch Wall in TO 1). GANDA had shown the fence/wall consisting of four points, but many more are present.

Photos: 119-1950 to 119-1960

Both the existing GANDA site tag and the new PTA-CR site washer were located with the Trimble TSC-1.

Site 23452 Washer	120 sec.	R010520A.cor
234524.494		
2184965.263		
1949.430m AMSL		

GANDA T-40 6/24/03 Tag	R010520A.cor
234499.890	
2184975.191	
1951.687m AMSL	

A total of 87 GPS points were collected at existing fence post locations. Associated features (walls built below the fence wire, causeways, and clearings on the north side of the fence) were discussed in the notes, although these were not given specific feature designations at this time. These data are contained within Table 1.

The crew was not able to finish the location to Site 23452 on this date. Further work will need to take place. Coincidentally, Site 23452 appears to be the same fence/wall alignment as that shown at GANDA Site 23451 and PTA-CR Temporary Site T-101404-1. It is recommended that once mapping and location of this site is completed, the fence/wall be assigned a single site number (Site 23452) as it passes across PTA.

The team returned to the Cantonment at 1630 hrs.

December 5, 2008

Date	Crew	Hours	TA	ASA
1/31/2006	GE & JH	16	06	N/A

Site Targets
Site 23452

Located
Site 23452

New Discoveries
N/A

Notes

The crew left the Cantonment at 0800 hrs. and drove to Training Area 06 to continue locating fence posts at Site 23452. This is a GANDA site number for a ranch wall that appears to begin at Site 5002 near Saddle Road. It travels westerly through TA 06, 07, 08, and possibly 13. This also appears to connect to PTA-CRM T-011404-1, but this is not certain at this time.

Photos: 120-2021 to 120-2025

All posts were located with the Trimble TSC-1, occupied for 60 seconds, and corrected (Rover File # R013119A.cor). Short descriptions were also taken in selected areas and all data are presented in Table 1.

A total of 84 GPS points were collected at existing fence post locations. Associated features (walls built below the fence wire, causeways, and clearings on the north side of the fence) were discussed in the notes, although these were not given specific feature designations at this time. These data are contained within Table 1.

The crew was not able to finish the location of Site 23452 on this date. Further work will need to take place. Coincidentally, Site 23452 appears to be the same fence/wall alignment as that shown at GANDA Site 23451 and PTA-CR Temporary Site T-101404-1. It is recommended that once mapping and location of this site is completed, the fence/wall be assigned a single site number (Site 23452) as it passes across PTA.

The team returned to the Cantonment at 1645 hrs.

December 5, 2008

Date	Crew	Hours	TA	ASA
2/10/2006	GE & JH	14	06	-

Site Targets
Site 23452

Located
Site 23452

New Discoveries

Notes

GE and JH left the PTA Cantonment at 0900 hrs. and traveled to Training Area 06 to continue the location of fence posts along the Site 23452 east/west alignment.

This is a GANDA site number for a ranch wall that appears to begin at Site 5002 near Saddle Road. It travels westerly through TA 06, 07, 08, and possibly 13. This also appears to connect to PTA-CRM T-011404-1, but this is not certain at this time.

Photos: 120-2066 to 120-2073.

All posts were located with the Trimble TSC-1, occupied for 60 seconds, and corrected (Rover File # R021020A.cor). Short descriptions were also taken in selected areas and all data are presented in Table 1.

A total of 64 GPS points were collected at existing fence post locations. Associated features (walls built below the fence wire, causeways, and clearings on the north side of the fence) were discussed in the notes, although these were not given specific feature designations at this time. These data are contained within Table 1.

The crew was not able to finish the location of Site 23452 on this date. Further work will need to take place. Coincidentally, Site 23452 appears to be the same fence/wall alignment as that shown at GANDA Site 23451 and PTA-CR Temporary Site T-101404-1. It is recommended that once mapping and location of this site is completed, the fence/wall be assigned a single site number (Site 23452) as it passes across PTA.

The team returned to the Cantonment at 1645 hrs.

December 5, 2008

Date	Crew	Hours	TA	ASA
2/17/2006	JH & GE	13	06	-

Site Targets
Site 23452

Located
Site 23452

New Discoveries

Notes

GE and JH left the PTA Cantonment at 0800 hrs. and traveled to Training Area 06 to continue the location of fence posts along the Site 23452 east/west alignment.

This is a GANDA site number for a ranch wall that appears to begin at Site 5002 near Saddle Road. It travels westerly through TA 06, 07, 08, and possibly 13. This also appears to connect to PTA-CRM T-011404-1, but this is not certain at this time.

Photos: _____ to _____.

All posts were located with the Trimble TSC-1, occupied for 60 seconds, and corrected (Rover File # R021719A.cor). Short descriptions were also taken in selected areas and all data are presented in Table 1.

A total of 50 GPS points were collected at existing fence post locations. Associated features (walls built below the fence wire, causeways, and clearings on the north side of the fence) were discussed in the notes, although these were not given specific feature designations at this time. These data are contained within Table 1.

The fence mapping project has progressed up to the AHA (Ammunition Holding Area) 2 location and Menhune Road. West of this point is the BAX (Battle Area Complex) footprint which is currently undergoing ordnance clearance during the weekdays. The location of the Site 23452 fenceline will have to work around this schedule since entry is not allowed during ordnance clearance activities.

The crew was not able to finish the location of Site 23452 on this date. Further work will need to take place. Coincidentally, Site 23452 appears to be the same fence/wall alignment as that shown at GANDA Site 23451 and PTA-CR Temporary Site T-101404-1. It is recommended that once mapping and location of this site is completed, the fence/wall be assigned a single site number (Site 23452) as it passes across PTA.

The team returned to the Cantonment at 1500 hrs.

December 5, 2008

Date	Crew	Hours	TA	ASA
2/24/2006	GE & JH	13	07	-

Site Targets
Site 23452

Located
Site 23452

New Discoveries

Notes

GE and JH left the PTA Cantonment at 0800 hrs. and traveled to Training Area 07 to continue the location of fence posts along the Site 23452 east/west alignment.

This is a GANDA site number for a ranch wall that appears to begin at Site 5002 near Saddle Road. It travels westerly through TA 06, 07, 08, and possibly 13. This also appears to connect to PTA-CRM T-011404-1, but this is not certain at this time.

Photos: None Taken.

All posts were located with the Trimble TSC-1, occupied for 60 seconds, and corrected (Rover File # R022422A.cor). Short descriptions were also taken in selected areas and all data are presented in Table 1.

A total of 42 GPS points were collected at existing fence post locations. Associated features (walls built below the fence wire, causeways, and clearings on the north side of the fence) were discussed in the notes, although these were not given specific feature designations at this time. These data are contained within Table 1.

The crew was not able to finish the location of Site 23452 on this date. Further work will need to take place. Coincidentally, Site 23452 appears to be the same fence/wall alignment as that shown at GANDA Site 23451 and PTA-CR Temporary Site T-101404-1. It is recommended that once mapping and location of this site is completed, the fence/wall be assigned a single site number (Site 23452) as it passes across PTA.

The team returned to the Cantonment at 1500 hrs

December 5, 2008

Date	Crew	Hours	TA	ASA
3/2/2006	GE & JH	14	07 & 08	-

Site Targets
Site 23452

Located
Site 23452

New Discoveries
N/A

Notes

GE and JH left the PTA Cantonment at 0800 hrs. and traveled to Training Area 07 & 08 to continue the location of fence posts along the Site 23452 east/west alignment.

This is a GANDA site number for a ranch wall that appears to begin at Site 5002 near Saddle Road. It travels westerly through TA 06, 07, 08, and possibly 13.

Photos: None Taken.

All posts were located with the Trimble TSC-1, occupied for 60 seconds, and corrected (Rover File # R030218A.cor). Short descriptions were also taken in selected areas and all data are presented in Table 1.

A total of 109 GPS points were collected at existing fence post locations. Associated features (walls built below the fence wire, causeways, and clearings on the north side of the fence) were discussed in the notes, although these were not given specific feature designations at this time. These data are contained within Table 1.

The crew was not able to finish the location of Site 23452 on this date. Further work will need to take place. Coincidentally, Site 23452 appears to be the same fence/wall alignment as that shown at GANDA Site 23451 and also includes PTA-CR Temporary Site T-101404-1. It is recommended that once mapping and location of this site is completed, the fence/wall be assigned a single site number (Site 23452) as it passes across PTA.

The team returned to the Cantonment at 1500 hrs

December 5, 2008

Date	Crew	Hours	TA	ASA
3/8/2006	JH & GE	14.0	08	-
Site Targets				
Site 23452				

Located
Site 23452

New Discoveries
N/A

Notes

GE and JH left the PTA Cantonment at 0800 hrs. and traveled to Training Area 08 to continue the location of fence posts along the Site 23452 east/west alignment.

This is a GANDA site number for a ranch wall that appears to begin at Site 5002 near Saddle Road. It travels westerly through TA 06, 07, 08, and possibly 13.

Photos: 121-2121.

All posts were located with the Trimble TSC-1, occupied for 60 seconds, and corrected (Rover File # R030819A.cor). Short descriptions were also taken in selected areas and all data are presented in Table 1.

A total of 88 GPS points were collected at existing fence post locations and fence features. Associated features (walls built below the fence wire, causeways, and clearings on the north side of the fence) were discussed in the notes, although these were not given specific feature designations at this time. These data are contained within Table 1.

The crew was not able to finish the location of Site 23452 on this date. Further work will need to take place. Coincidentally, Site 23452 appears to be the same fence/wall alignment as that shown at GANDA Site 23451 and also includes PTA-CR Temporary Site T-101404-1. It is recommended that once mapping and location of this site is completed, the fence/wall be assigned a single site number (Site 23452) as it passes across PTA.

The team returned to the Cantonment at 1500 hrs

December 5, 2008

Date	Crew	Hours	TA	ASA
3/16/2006	GE & JH	16.0	09	?

Site Targets
23452

Located
23452

New Discoveries
N/A

Notes

The team left the Cantonment @ 0800 hrs. and traveled to the fence line at Site 23452. A total of 135 GPS points were collected at existing fence post locations.

Photos: None

Site 23452 Fence Post Locations (Various) 60 sec. R031618A.cor

All posts were located with the Trimble TSC-1, occupied for 60 seconds, and corrected (Rover File # R031618A.cor). Short descriptions were also taken in selected areas and all data are presented in Table 1.

A total of 135 GPS points were collected at existing fence post locations and fence features. Associated features (walls built below the fence wire, causeways, and clearings on the north side of the fence) were discussed in the notes, although these were not given specific feature designations at this time.

The crew was not able to finish the location of Site 23452 on this date. Further work will need to take place. Coincidentally, Site 23452 appears to be the same fence/wall alignment as that shown at GANDA Site 23451 and also includes PTA-CR Temporary Site T-101404-1. It is recommended that once mapping and location of this site is completed, the fence/wall be assigned a single site number (Site 23452) as it passes across PTA.

The team returned to the Cantonment at 1500 hrs

December 5, 2008

Date	Crew	Hours	TA	ASA
3/17/2006	JH & GE	16.0	13	?

Site Targets
Site 23452

Located
Site 23452

New Discoveries
N/A

Notes

The team left the Cantonment @ 0800 hrs. and traveled to the fence line at Site 23452. A total of 116 GPS points were collected at existing fence post locations.

Photos: None

Site 23452 Fence Post Locations (Various) 60 sec. R031719A.cor

All posts were located with the Trimble TSC-1, occupied for 60 seconds, and corrected (Rover File # R031719A.cor). Short descriptions were also taken in selected areas and all data are presented in Table 1.

A total of 116 GPS points were collected at existing fence post locations and fence features. Associated features (walls built below the fence wire, causeways, and clearings on the north side of the fence) were discussed in the notes, although these were not given specific feature designations at this time.

T-050406-01 Ahu/Boundary Marker R031719A.cor

225497.978
2187461.224
1688.781m AMSL

1.4 x 1.2 (long E/W) - Roughly rectangular of piled cobbles sitting one-three courses high. There is a branch sticking out of the SW corner about 0.45m above top of feature.

Photo: 122-2235
Facing south with 1m scale

The crew was not able to finish the location of Site 23452 on this date. Further work will need to take place. Coincidentally, Site 23452 appears to be the same fence/wall alignment as that shown at GANDA Site 23451 and also includes PTA-CR Temporary Site T-101404-1. It is recommended that once mapping and location of this site is completed, the fence/wall be assigned a single site number (Site 23452) as it passes across PTA.

The team returned to the Cantonment at 1500 hrs

December 5, 2008

Date	Crew	Hours	TA	ASA
3/22/2006	CS & GE	16.0	13	?

Site Targets
Site 23452

Located
Site 23452

New Discoveries
N/A

Notes

The team left the Cantonment @ 0800 hrs. and traveled to the fence line at Site 23452. A total of 148 GPS points were collected at existing fence post locations.

Photos: None

Site 23452 Fence Post Locations (Various) 60 sec. R032209A.cor

All posts were located with the Trimble TSC-1 occupied for 60 seconds, and corrected (Rover File # R032209A.cor). Short descriptions were also taken in selected areas and all data are presented in Table 1.

A total of 114 GPS points were collected at existing fence post locations and fence features. Associated features (walls built below the fence wire, causeways, and clearings on the north side of the fence) were discussed in the notes, although these were not given specific feature designations at this time.

The crew was not able to finish the location of Site 23452 on this date. Further work will need to take place. Coincidentally, Site 23452 appears to be the same fence/wall alignment as that shown at GANDA Site 23451 and also includes PTA-CR Temporary Site T-101404-1. It is recommended that once mapping and location of this site is completed, the fence/wall be assigned a single site number (Site 23452) as it passes across PTA.

The team returned to the Cantonment at 1500 hrs

December 5, 2008

Date	Crew	Hours	TA	ASA
3/23/2006	CS & GE	16.0	13	

Site Targets
Site 23452

Located
Site 23452

New Discoveries
N/A

Notes

The team left the Cantonment @ 0800 hrs. and traveled to the fence line at Site 23452. A total of 110 GPS points were collected at existing fence post locations.

Photos: None

Site 23452 Fence Post Locations (Various) 60 sec. R032311A.cor

All posts were located with the Trimble TSC-1, occupied for 60 seconds, and corrected (Rover File # R032311A.cor). Short descriptions were also taken in selected areas and all data are presented in Table 1.

A total of 110 GPS points were collected at existing fence post locations and fence features. Associated features (walls built below the fence wire, causeways, and clearings on the north side of the fence) were discussed in the notes, although these were not given specific feature designations at this time.

The crew was not able to finish the location of Site 23452 on this date. Further work will need to take place. Coincidentally, Site 23452 appears to be the same fence/wall alignment as that shown at GANDA Site 23451 and also includes PTA-CR Temporary Site T-101404-1. It is recommended that once mapping and location of this site is completed, the fence/wall be assigned a single site number (Site 23452) as it passes across PTA.

The team returned to the Cantonment at 1500 hrs

December 5, 2008

Date	Crew	Hours	TA	ASA
4/6/2006	GE & CS	16.0	13	

Site Targets
Site 23452

Located
Site 23452

New Discoveries
N/A

Notes

The team left the Cantonment @ 0800 hrs. and traveled to the fence line at Site 23452. A total of 101 GPS points were collected at existing fence post locations.

Photos: None

Site 23452 Fence Post Locations (Various) 60 sec. R040611A.cor

All posts were located with the Trimble TSC-1, occupied for 60 seconds, and corrected (Rover File # R040611A.cor). Short descriptions were also taken in selected areas and all data are presented in Table 1.

A total of 101 GPS points were collected at existing fence post locations and fence features. Associated features (walls built below the fence wire, causeways, and clearings on the north side of the fence) were discussed in the notes, although these were not given specific feature designations at this time.

The crew was not able to finish the location of Site 23452 on this date. Further work will need to take place. Coincidentally, Site 23452 appears to be the same fence/wall alignment as that shown at GANDA Site 23451 and also includes PTA-CR Temporary Site T-101404-1. It is recommended that once mapping and location of this site is completed, the fence/wall be assigned a single site number (Site 23452) as it passes across PTA.

The team returned to the Cantonment at 1500 hrs

December 5, 2008

Date	Crew	Hours	TA	ASA
4/7/2006	GE & CS	16.0	13	

Site Targets
Site 23452

Located
Site 23452

New Discoveries
N/A

Notes

The team left the Cantonment @ 0800 hrs. and traveled to the fence line at Site 23452. A total of 80 GPS points were collected at existing fence post locations.

Photos: None

Site 23452 Fence Post Locations (Various) 60 sec. R040709A.cor

All posts were located with the Trimble TSC-1, occupied for 60 seconds, and corrected (Rover File # R040709A.cor). Short descriptions were also taken in selected areas and all data are presented in Table 1.

A total of 80 GPS points were collected at existing fence post locations and fence features. Associated features (walls built below the fence wire, causeways, and clearings on the north side of the fence) were discussed in the notes, although these were not given specific feature designations at this time.

The crew was not able to finish the location of Site 23452 on this date. Further work will need to take place. Coincidentally, Site 23452 appears to be the same fence/wall alignment as that shown at GANDA Site 23451 and also includes PTA-CR Temporary Site T-101404-1. It is recommended that once mapping and location of this site is completed, the fence/wall be assigned a single site number (Site 23452) as it passes across PTA.

The team returned to the Cantonment at 1500 hrs

December 5, 2008

Date	Crew	Hours	TA	ASA
5/4/2006	JH & GE	16.0	13	-

Site Targets
Site 23452

Located
Site 23452

New Discoveries
T-050406-01

Notes

The team left the Cantonment @ 0800 hrs. and traveled to the fence line at Site 23452. A total of 43 GPS points were collected at existing fence post locations.

Photos: None

Site 23452 Fence Post Locations (Various) 60 sec. R050417A.cor

All posts were located with the Trimble TSC-1, occupied for 60 seconds, and corrected (Rover File # R050417A.cor). Short descriptions were also taken in selected areas and all data are presented in Table 1.

A total of 43 GPS points were collected at existing fence post locations and fence features. Associated features (walls built below the fence wire, causeways, and clearings on side of the fence) were discussed in the notes, although these were not given specific feature designations at this time.

A new site (T050406-01), an ahu or cairn was located approximately 1.7m west of the fence line corner. The corrected Trimble location is 225497.970m E, 2187461.224m N, 1688.781m AMSL and the feature measures 1.2 (N/S) x 1.4m. The feature is roughly rectangular and constructed of piled cobbles-small boulders one to three courses high. There is a branch sticking out of the top SW corner and is 0.45m above the top of the structure. A photograph (122_2235) was taken.

The crew was not able to finish the location of Site 23452 on this date. Further work will need to take place. Coincidentally, Site 23452 appears to be the same fence/wall alignment as that shown at GANDA Site 23451 and also includes PTA-CR Temporary Site T-101404-1. It is recommended that once mapping and location of this site is completed, the fence/wall be assigned a single site number (Site 23452) as it passes across PTA.

The team returned to the Cantonment at 1500 hrs

December 5, 2008

Date	Crew	Hours	TA	ASA
5/17/2006	JH	8.0	01	-

Site Targets
Site 23452

Located
Site 23452

New Discoveries
N/A

Notes

The worker left the Cantonment @ 0800 hrs. and traveled to the fence line at Site 23452. A total of 92 GPS points were collected at existing fence post locations.

Photos: None

Site 23452 Fence Post Locations (Various) 60 sec. R051719A.cor

All posts were located with the Trimble TSC-1, occupied for 60 seconds, and corrected (Rover File # R051719A.cor). Short descriptions were also taken in selected areas and all data are presented in Table 1.

A total of 92 GPS points were collected at existing fence post locations and fence features. Associated features (walls built below the fence wire, causeways, and clearings on the north side of the fence) were discussed in the notes, although these were not given specific feature designations at this time.

The crew was not able to finish the location of Site 23452 on this date. Further work will need to take place. Coincidentally, Site 23452 appears to be the same fence/wall alignment as that shown at GANDA Site 23451 and also includes PTA-CR Temporary Site T-101404-1. It is recommended that once mapping and location of this site is completed, the fence/wall be assigned a single site number (Site 23452) as it passes across PTA.

The worker returned to the Cantonment at 1630 hrs.

December 5, 2008

Date	Crew	Hours	TA	ASA
5/18/2006	JH	8.0	04	-

Site Targets
Site 23452

Located
Site 23452

New Discoveries
N/A

Notes

The worker left the Cantonment @ 0800 hrs. and traveled to the fence line at Site 23452. A total of 72 GPS points were collected at existing fence post locations.

Photos: None

Site 23452 Fence Post Locations (Various) 60 sec. R051820A.cor

All posts were located with the Trimble TSC-1, occupied for 60 seconds, and corrected (Rover File # R051820A.cor). Short descriptions were also taken in selected areas and all data are presented in Table 1.

A total of 72 GPS points were collected at existing fence post locations and fence features. Associated features (walls built below the fence wire, causeways, and clearings on the north side of the fence) were discussed in the notes, although these were not given specific feature designations at this time.

The crew was not able to finish the location of Site 23452 on this date. Further work will need to take place. Coincidentally, Site 23452 appears to be the same fence/wall alignment as that shown at GANDA Site 23451 and also includes PTA-CR Temporary Site T-101404-1. It is recommended that once mapping and location of this site is completed, the fence/wall be assigned a single site number (Site 23452) as it passes across PTA.

The worker returned to the Cantonment at 1630 hrs.

December 5, 2008

Date	Crew	Hours	TA	ASA
5/19/2006	JH	8.0	01	-

Site Targets
Site 23452

Located
Site 23452

New Discoveries
N/A

Notes

The worker left the Cantonment @ 0800 hrs. and traveled to the fence line at Site 23452. A total of 72 GPS points were collected at existing fence post locations.

Photos: None

Site 23452 Fence Post Locations (Various) 60 sec. R051922A.cor

All posts were located with the Trimble TSC-1, occupied for 60 seconds, and corrected (Rover File # R051922A.cor). Short descriptions were also taken in selected areas and all data are presented in Table 1.

A total of 72 GPS points were collected at existing fence post locations and fence features. Associated features (walls built below the fence wire, causeways, and clearings on the north side of the fence) were discussed in the notes, although these were not given specific feature designations at this time.

The crew was not able to finish the location of Site 23452 on this date. Further work will need to take place. Coincidentally, Site 23452 appears to be the same fence/wall alignment as that shown at GANDA Site 23451 and also includes PTA-CR Temporary Site T-101404-1. It is recommended that once mapping and location of this site is completed, the fence/wall be assigned a single site number (Site 23452) as it passes across PTA.

The worker returned to the Cantonment at 1630 hrs.

December 5, 2008

Date	Crew	Hours	TA	ASA
5/24/2006	JH	8.0	04	-

Site Targets
Site 23452

Located
Site 23452

New Discoveries
N/A

Notes

The worker left the Cantonment @ 0800 hrs. and traveled to the fence line at Site 23452. A total of 87 GPS points were collected at existing fence post locations.

Photos: None

Site 23452 Fence Post Locations (Various) 60 sec. R052418A.cor

All posts were located with the Trimble TSC-1, occupied for 60 seconds, and corrected (Rover File # R052418A.cor). Short descriptions were also taken in selected areas and all data are presented in Table 1.

A total of 87 GPS points were collected at existing fence post locations and fence features. Associated features (walls built below the fence wire, causeways, and clearings on the north side of the fence) were discussed in the notes, although these were not given specific feature designations at this time.

The crew was not able to finish the location of Site 23452 on this date. Further work will need to take place. Coincidentally, Site 23452 appears to be the same fence/wall alignment as that shown at GANDA Site 23451 and also includes PTA-CR Temporary Site T-101404-1. It is recommended that once mapping and location of this site is completed, the fence/wall be assigned a single site number (Site 23452) as it passes across PTA.

The worker returned to the Cantonment at 1630 hrs.

December 5, 2008

Date	Crew	Hours	TA	ASA
5/25/2006	JH	8.0	01	-
Site Targets				
Site 23452				

Located
Site 23452

New Discoveries
N/A

Notes

The worker left the Cantonment @ 0800 hrs. and traveled to the fence line at Site 23452. A total of 43 GPS points were collected at existing fence post locations.

Photos: None

Site 23452 Fence Post Locations (Various) 60 sec. R052520A.cor

All posts were located with the Trimble TSC-1, occupied for 60 seconds, and corrected (Rover File # R052520A.cor). Short descriptions were also taken in selected areas and all data are presented in Table 1.

A total of 43 GPS points were collected at existing fence post locations and fence features. Associated features (walls built below the fence wire, causeways, and clearings on the north side of the fence) were discussed in the notes, although these were not given specific feature designations at this time.

The crew was not able to finish the location of Site 23452 on this date. Further work will need to take place. Coincidentally, Site 23452 appears to be the same fence/wall alignment as that shown at GANDA Site 23451 and also includes PTA-CR Temporary Site T-101404-1. It is recommended that once mapping and location of this site is completed, the fence/wall be assigned a single site number (Site 23452) as it passes across PTA.

The worker returned to the Cantonment at 1630 hrs.

December 5, 2008

Date	Crew	Hours	TA	ASA
6/23/2006	JH & GE	16.0	01	-

Site Targets
Site 23452

Located
Site 23452

New Discoveries
N/A

Notes

The team left the Cantonment @ 0800 hrs. and traveled to the fence line at Site 23452. A total of 36 GPS points were collected at existing fence post locations.

Photos: None

Site 23452 Fence Post Locations (Various) 60 sec. R062323A.cor

All posts were located with the Trimble TSC-1, occupied for 60 seconds, and corrected (Rover File # R062323A.cor). Short descriptions were also taken in selected areas and all data are presented in Table 1.

A total of 36 GPS points were collected at existing fence post locations and fence features. Associated features (walls built below the fence wire, causeways, and clearings on the north side of the fence) were discussed in the notes, although these were not given specific feature designations at this time.

The crew was not able to finish the location of Site 23452 on this date. Further work will need to take place. Coincidentally, Site 23452 appears to be the same fence/wall alignment as that shown at GANDA Site 23451 and also includes PTA-CR Temporary Site T-101404-1. It is recommended that once mapping and location of this site is completed, the fence/wall be assigned a single site number (Site 23452) as it passes across PTA.

The team returned to the Cantonment at 1630 hrs.

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Trail Site# 5007 Field Recordation

June 9, 2006

Natural Setting

Trail Site# 5007 is located on a brown Mauna Loa K2 'ā'a flow at roughly 5250ft (1750m) above mean sea level. The flow is not vegetated. The southwest terminus of the trail is at the 1859 *pāhoehoe* flow, and the northeast terminus is at another *pāhoehoe* flow.

T-060906-03 is a single angular *pāhoehoe* boulder placed on the ground surface roughly ten meters west of the southwest terminus of trail Site 5007 (Photo 123-2312). The boulder measures approximately 0.25m in diameter and is 0.40m in height. The *ahu* is a trail marker, is unaltered, and is in good condition.



Plate 7. T-060906-03 and -04 *ahu*

T-060906-04 is an *ahu* located 2.3m west (260°) of T-060906-03 (Photo 123-2312). It measures 0.45m in diameter by 0.35m in height. The *ahu* is constructed of angular *pāhoehoe* cobbles and small boulders piled three courses high. The *ahu* is a trail marker, is unaltered, and is in good condition. No artifacts were located at either *ahu*. The two *ahu* likely point out the direction of intended travel across the *pāhoehoe* flow. If so, the trail corridor was located at the southwestern edge of Hualalai.

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T-060906-05 is an *ahu* located on the 1859 *pāhoehoe* flow, roughly one meter west of the K2 'ā'a flow (Photo 123-2313). The *ahu* is 1.2m long (north/south) by 1m wide, and is 0.45m in height. It is constructed of subangular 'ā'a cobbles and small boulders, and slabby *pāhoehoe* cobbles and small boulders piled three to four courses high. No stacking or facing is evident. The *ahu* might be a trail marker (though no trail is evident on the *pāhoehoe* surface), is unaltered, and is in good condition.



Plate 8. T-060906-05 *ahu* looking northeast

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APVG-GT-ENV

14 January 2006

MEMORANDUM FOR THE RECORD

SUBJECT: Archaeological and Historical Monitoring of Cesspool Testing at Kilauea Military Camp, Puna District, Hawai'i Island, Hawaii.

1. On 10 January 2006, James Head PTA Cultural Resources Specialist, traveled to Kilauea Military Camp (KMC) in the *ahupua'a* of Keauhou (TMK (3) 9-9-00-10:01), inside of Hawai'i Volcanoes National Park (Figure 3). This trip was to support an archaeological and historical examination for the location and testing of existing cesspools within the boundaries of KMC. Mr. Head met with Mr. Roger Panzer, Maintenance Mechanic Supervisor, KMC-DPW Engineering/Maintenance Shop at KMC.
2. This project was concerned with the location of 21 cesspools thought to lie within the KMC footprint. Once these units were located, the overburden would be removed both by hand and by backhoe, the cover slipped, and the cesspool interior investigated for inlets, dimensions, depth of the sludge and general condition. Most excavation was done with the backhoe, although final cleaning and testing was done by hand in order to minimize damage to the structures. Generally, overburden ranges from 0.25 to 0.40m of disturbed soils on top of the cesspools.
3. The PTA-CR crew was responsible for archaeological monitoring of the overburden and using the Trimble TSC-1 to accurately locate the Cesspool entries. Because of the disturbed nature of the Cesspool locations, it was unlikely any intact cultural deposits would be encountered.
4. Construction personnel involved with this project included: Vanentin Bueno - Civil Engineer from Parsons, Brinkerhoff, Quade, & Douglas, Inc.; Stanley Kubo - Isemoto Construction Supervisor; Harold Kama - Isemoto Construction Supervisor; Brenda ? - Isemoto Construction Operator; Ronnie ? - Isemoto Construction Laborer.
5. All Corrected Trimble GPS Locations (Rover Files #R011100A, #R011123A, #R011219A, & R011402A) of the completed Cesspool Inspection points are given in Table 1.
6. Prior to the archaeologist's arrival at the project area, the following locations were already completed: Cesspools #05, #18, #20, #01, #17, #13, and #02. Excavation of the entry points was not monitored, but it is very unlikely any cultural deposits were disturbed during this action since the deposits were disturbed during the original cesspool excavations.
7. Four additional Cesspools were located and inspected on 10 January 2006. Locations are shown on Figure 3 and given in Table 4. Cesspool #6 is located to the Northeast of Bldg. 55 in the lawn. The entry is covered by approximately 0.40m of disturbed overburden. Cesspool #7 is also to the Northwest of Bldg. 55, and has about 0.40m of disturbed soils over the entry port. Cesspool #10 entry is located between Bldgs. 59 and 81 and is covered by a steel plate on the surface over a square wooden shaft. Cesspool #11 is located very near Bldg. 24. There is an oblong alignment of cement blocks (0.30 x 0.20 x 0.13m thick) resting on the surface. Three pieces on Pierced Steel Planking (PSP or Marston Matting) were found during the excavation of the

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Cesspool #11 entry. These were probably used to support the soil after the roof of the cesspool had collapsed. Below the PSP was a large steel plate (1.5m²) covering this collapse.

January 11, 2006

8. Two cesspool entry locations were found and inspected on this date. Cesspool #8 entry was located to the West-Southwest of Bldg. 76 with about 0.30m of overburden. Cesspool #9 was found just to the west of Bldg. 35A (bowling alley). The location of Cesspool #9 involved a great amount of excavation to locate. During this testing, an area of rubbish was located about 0.70m below surface at 231191.889m E, 2150414.655m N. Materials found at this historic dump consisted of a heavy metal "X" support measuring 0.87 x 0.03 x 0.65m high (Plate 9), a complete Bayer aspirin bottle measuring 0.06 x 0.04 x 0.29 and embossed with "The Bayer Company Inc." along lateral margins on both faces (Plate 10). This bottle probably dates to the 1930's based on the advertisement pictured below (Plate 11). Also found was a white ceramic faucet handle with a partially embedded brass bolt (Plate 12). After examination, the materials were reburied in the same location.
9. Per the request of KMC-DPW, when buried utility lines were exposed, a short description of the utility including material, size, orientation, and depth below surface was recorded, along with a Trimble GPS point. These data, presented in Table 2, will continue to assist the Dept. of Public Works in mapping the subsurface utilities of KMC.

January 12, 2006

10. Two cesspool entry locations were found and inspected on this date. Cesspool #12 entry was located just to the east of Bldg. 96 in a lawn area. The overburden was about 0.40m thick. Cesspool #21 entry was found west of Bldg. 81, west of a 1.8m high metal fence. This was not entered since the backhoe could not access the area and it lies outside of the project. Attempts were made to locate Cesspools #14 and #15, but these were not found.

January 13, 2006

11. Cesspool #16 entry was located between Bldg. 24 and 26 in a parking area. The overburden was about 0.30m deep and was the only location for the day. Further attempts were made to find Cesspools #14 and #15, but they were again not found. These features will be located by Pural Leak Testing and the data will be used to complete the Cesspool inspection project in early February 2006. At that time, the remainder of Cesspool Entry points and sub-surface utility line readings will be taken.

James Head
Cultural Resource
Specialist
Environmental Office,
PTA

Map removed to protect rare resources. Available upon request

Table 4. KMC Cesspool Entries.

ID	EASTING	NORTHING	COMMENT
1	261214.713	2150552.886	CESSPOOL #06 ENTRY
2	261175.147	2150534.692	CESSPOOL #07 ENTRY
3	261053.589	2150438.245	CESSPOOL #10 ENTRY
4	261152.601	2150412.808	CESSPOOL #11 ENTRY
5	261274.781	2150509.772	CESSPOOL #05 ENTRY
6	261405.906	2150364.051	CESSPOOL #20 ENTRY
7	261383.170	2150474.355	CESSPOOL #01 ENTRY
8	261343.100	2150496.019	CESSPOOL #17 ENTRY
9	261351.004	2150580.329	CESSPOOL #02 ENTRY
10	261106.589	2150467.475	CESSPOOL #08 ENTRY
11	261208.269	2150418.458	CESSPOOL #09 ENTRY
12	261205.299	2150373.955	CESSPOOL #12 ENTRY
13	260999.059	2150412.044	PROBABLE CESSPOOL #21 LOCATION
14	261083.999	2150383.646	CESSPOOL #19 ENTRY
15	261147.928	2150369.807	CESSPOOL #16 ENTRY

Table 5. KMC Locations.

ID	EASTING	NORTHING	COMMENT
LOC #1	261112.322	2150462.677	3"? Copper Water Line (100/280°) buried 6" deep.
LOC #2	261115.461	2150461.351	5"? Cast Iron line (84/264°) at 6" deep.
LOC #3	261110.706	2150462.381	Black 6" PVC(?) (90/270°) buried 6" deep.
LOC #4	261191.889	2150414.655	Metal table or tank support, Bayer Aspirin Bottle, and White Ceramic Faucet Handle in backhole trench.
LOC #5	261012.650	2150414.855	6" Black PVC pipe at (30/210°) buried 10" deep.
LOC #6	261205.452	2150373.626	Single buried electrical cable (10/190°) buried 6" deep.
LOC #7	261003.485	2150417.186	Hurricane Fence between KMC Compound and probable Cesspool #21 location.
LOC #8	261004.418	2150410.042	Hurricane Fence between KMC Compound and probable Cesspool #21 location.
LOC #9	261155.416	2150291.529	4" Cast Iron line (150/330°) buried 11" deep.
LOC #10	261155.832	2150292.318	1" Copper line (150/330) buried 5" deep.
LOC #11	261156.039	2150293.287	Electrical Conduit with three wires (38/218°) buried 7" deep.
LOC #12	261155.702	2150292.362	5"(?) Cast Iron line (82/262°) buried 16" deep.
LOC #13	261155.170	2150292.563	5" Cast Iron line (172/352°) buried 15" deep.
LOC #14A	261168.903	2150293.065	Asbestor-Cements (A-C) or Transite (Asbestos) pipe (80/260°) buried 9" deep.
LOC #14B	261161.956	2150292.746	Asbestor-Cements (A-C) or Transite (Asbestos) pipe (80/260°) buried 9" deep.
LOC #14C	261159.547	2150292.608	Asbestor-Cements (A-C) or Transite (Asbestos) pipe (80/260°) buried 9" deep.

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Plate 9. Heavy metal "X" support found near Cesspool #9 entry.



Plate 10. Complete bottle marked "The Bayer Aspirin Company Inc. found near Cesspool #9 Entry.

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Plate 11. A Bayer Aspirin Advertisement from 1935. Note similarity to specimen found near Cesspool #9.



Plate 12. This is a ceramic faucet handle found near Cesspool #9.

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CURATION REPORT 2005-2006

Materials collected and maintained at the PTA curation facility include database information, artifacts, a small natural history collection, maps, and original field notes. An archaeological collection is defined by 36 CFR 79.4 as “material remains that are excavated or removed during a survey, excavation, or other study of a prehistoric or historic resource, and associated records that are prepared or assembled in connection with the survey, excavation or other study.” The goal is to develop a system of information sharing with a well established facility in accordance with all federal regulations.

Background

The PTA curation facility was first established in September 1998 with the fundamental goal of identifying, collecting and housing all items related to previous cultural surveys conducted at Pōhakuloa Training Area. These items include field notes, original slides, maps, computer disks, site forms, photographs, negatives, and all reports. Contractors who had conducted surveys at PTA and the University of Hawai‘i were contacted and subsequently all artifacts were returned to Pōhakuloa Training Area, most in less than satisfactory condition. All these materials were then stabilized and entered into the curation database.

Curation

All of the 82 boxes in the PTA Curation facility were fully accessioned, totaling 6,033 entries as of June 2006. First the site records were reviewed, if they were present. Damaged or worn records were replaced with new bag labels printed on acid free paper to better preserve provenience data. The assigned PTA number is then written in permanent marker on the outside of the bag to prevent loss of data from misplaced, faded or illegible information. The bags were then put back into the box and occasionally re-housed in padded boxes. Due to poor bag labeling, many of the later boxes were processed slowly. Ogden’s database containing the provenience information is present, but is only in a hardcopy format that is organized by site number. Each box also contains a printout of its contributions to the database. The projects that were inventoried and entered into the database from July 2005-June 2006 were:

- MPRC Survey and Data Recovery (Delivery Order 1) Ogden. DACA 83-91-D-0025. Contents include two boxes of charcoal and soil samples.
- Pōhakuloa Inventory Survey (Delivery Order 3) Ogden. DACA 83-95-D-0006. Contents include artifacts and faunal bone.
- Pōhakuloa Survey of Redleg Trail (Delivery Order 15) Ogden. DACA 83-91-D-0006. Contents include bone, lithics, charcoal, artifacts and flora in two boxes.

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- HPP for Bobcat Trail (Delivery Order 18) Ogden. DACA 83-991-D-0006. Contents include faunal bone, charcoal, artifacts and flora in three boxes.
- PTA Bobcat survey (Delivery Order 22) Ogden. DACA 83-91-D-0006. Contents include soil, charcoal, bone, wood, gourd and lithics in two boxes.
- PTA Redleg Trail Vicinity, Survey (Delivery Order 30) Ogden. DACA 83-91-D-0006. Contents include bulk samples, artifacts, faunal and bird bone, wood, charcoal, lithics and bulk samples in sixteen boxes
- PTA Redleg Lab (Delivery Order 32) Ogden. DACA 83-91-D-0006. Contents include unknown materials in one box.
- 1997 UH Mānoa field school projects.

The curation facility houses two fireproof metal cabinets that contain sensitive materials organized into major source material groups: plant (botanical), stone, wood, bone, shell and historical. The botanical cabinet is further classified according to material type or modified use: cordage, gourd, kī, niu (coconut), woven/knotted, and various botanicals/unidentified. Each shelf has been grouped by site. The materials in these cabinets are more fragile than the other materials in the boxes and are housed for better preservation. These materials include the kī leaf sandals, fire plow, adze handle and gourd bottle fragments.

Weekly maintenance and curatorial processes are maintained and conducted as needed. Maintenance includes dusting, sweeping and shaking out the carpets, reorganizing the materials and/or field equipment, and cleaning the air conditioner filter. A close eye is also kept on the relative humidity, temperature and any evidence of insect/rodent penetration.

Curation Facility Database

The curation database is in Microsoft Access format and is backed up on an external hard drive, on the network drive, and on CD ROM. Additionally a hard copy of the curation database is printed out and archived.

Accession numbers (PTA catalog numbers) are given to each artifact. The information fields in the database include:

Curation Location

ID

PTA Catalog Number

Project Name

Site number

Feature

Location

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Grid/Test unit
Layer/level
Depth
Contents
Contents2
Number of Samples
Weight
Collection Date
Box Number
Project bag #
Temp Field #
Delivery Order #
Comments
Max Length (mm)
Max Width (mm)
Max Thick (mm)
Loan Status

Bulk Sample Collection

A Bulk Sample (BS) Collection was created to differentiate the larger less sensitive soil/organic samples from the individual delicate artifacts and to make for a more efficient use of space in the facility and particularly in the curation cabinets. The collection now houses 163 bulk samples from various projects. Samples were sifted through 1/8 inch screen and extracted artifacts remain in the curation facility while the sterile matrix is moved to Quonset hut T-284. The bulk sample collection is expected to double by the time the curation cabinets are filled and the collections are permanently housed.

Curation Facility

One wall of wood shelving was removed and 6 professional Museum artifact cabinets/drawers were installed in their place. All housing/packaging material was taken out of the facility along with the map drawers. The cultural resources copier/printer machine was removed from the facility in order to alleviate traffic and prevent dust/dirt and pests from entering. Activities and tours of the facility have been for the most part ended, except in special circumstances when prior arrangements have been made. There is now more room in the facility with an immense effort to keep only artifacts and documents requiring climate control in the facility.

Interpretive Displays

Two interpretive displays were created. One at headquarters was made at the request of the commander and another in the environmental office conference room. Both show the importance of the saddle region and the activities that took place here several hundred years ago. The display within the environmental office has more of an emphasis on the

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birds of the area and reasons for their capture. Artifact condition is being monitored and if any degeneration is observed the artifact will be returned to the curation facility for stabilization.

Climate Control

Although Pōhakuloa is naturally a dry and cold environment lacking much moisture, the PTA curation facility is climate controlled. Monitoring of both humidity and temperature is done with a hygrothermograph, with a monthly chart produced and kept on file. Humidity ranges from 40 – 55 percent and the temperature is relatively stable averaging 60 degrees Fahrenheit.

Native Hawaiian Iwi

The last human remain in PTA Cultural Resource Department was repatriated this year. The remains consisted of a fragment of the distal end of a human humerus discovered during the Ogden 1993 survey on the MPRC project. The bone was recovered from a test unit and was initially identified as animal bone. Upon later inspection it was re-identified. There is no provenience information except that the bone is from State Site 50-10-30-10657, a lava tube cave site on Pōhakuloa Training Area. According to Fred Reinman and Allen Schilz in *Final Report Archaeological Data recovery at the Multipurpose Range Complex Pōhakuloa Training Area, Island of Hawaii* (1994:95-97), the radiocarbon dates indicate a probable range of 1000 BP to historic times. The time frame and context suggests that this bone is of Native Hawaiian ancestry. In April 2006 the iwi was repatriated and reburied by Kaumakaiwa “Lopaka” Kanaka‘ole Kanahale and Eddie Aiau in accordance with NAGPRA guidelines and Traditional Hawaiian protocol.

No outstanding human remains are in the possession of Pōhakuloa Training Area Cultural Resource Management program as of the writing of this report.

Recommendations and Conclusions

Based on the work during this period, the following recommendations are made for future work in the curation facility:

- Have all artifacts and associated artifacts permanently housed in Museum cabinets.
- Move all large bulk samples to the Bulk Sample collection in Quonset Hut T-284.
- Work with the UH Hilo to employ interns or possibly volunteers to help with the moving of artifacts into the cabinets and conduct additional diagnostic research on selected collections.
- Use all available space in the Museum cabinets and assess if more need to be purchased.
- Pull all of the Bulk samples from the collection and enter them into the BS collection with a notation of being sifted or not.

DATABASE DEVELOPMENT REPORT

The database development for the 2005-06 reporting period placed emphasis on data input from the field into a database. New ways of getting data into a database were developed making it easier to do so in whatever method was more convenient and comfortable for the user.

One of the methods being developed previously was the use of MS Excel spreadsheets in Project.xls files for data recording and importing into the Project.mdb and CR_PTA.mdb relational database files. This method was described in detail in the 2004-05 Annual report and an updated version can be reviewed Appendix A of this document. The spreadsheets were designed to record data for each project and perhaps each individual recorder creating multiple personal project files per project. A form in the Project.mdb was designed to accept all these spreadsheet tables and join them into a relational database format like the one in the CR_PTA.mdb. This method was used and improved upon this season and was the easiest and fastest way to record data if you were comfortable with the use of Excel spreadsheets. The improvements, upon user request, were the inclusion of some of the smaller spreadsheet tables such as Sites, Typology, Stations, Survey, and Dimensions into one large table called Site Form. Site Form had 37 fields total when all the smaller tables were combined so the related fields were grouped and color coded to better define them.

Site Index	Name ID	Description	Site Pre	Site No	Fea ID	Art ID	Category	OtherName	Date	Time PM	Recorder	Notes	Count
2	E16.1	Fe 1		E16	1		CAVE		1/12/06		14-I		
3	E17.1	Fe 1		E17	1		CAVE		1/12/06		14-I		
4	E18a.1	Fe 1		E18a	1		CAVE		1/12/06		14-I		
5	BC2.1	Fe 1	Gourd Cradle	BC2	1		CAVE		1/13/06		14-C		GDC: Gou
6	BC2.2	Fe 2	Upright	BC2	2		CAVE		1/13/06		14-C		UPR: Upri
7	BC3.1	Fe 1		BC3	1		CAVE		1/13/06		14-C		
8	BC4.1	Fe 1	Bird Bone Concentrations	BC4	1		CAVE		1/13/06		14-C		BNE: Bon
9	BC4.2	Fe 2	Bone Concentrations	BC4	2		CAVE		1/13/06		14-C		BNE: Bon
10	BC5.1	Fe 1	Bird Bone Concentration	BC5	1		CAVE		1/13/06		14-C		BNE: Bon
11	E33m.1	Fe 1	Burned Wood	E33m	1		CAVE		1/18/06	8:30	14-I		TCH: Torc
12	E33n.1	Fe 1	Water Concentration	E33n	1		CAVE		1/18/06		14-I		
13	E36a.1	Fe 1	Burned Wood	E36a	1		CAVE		1/18/06		14-I		TCH: Torc
14	E36a.2	Fe 2	Burned Wood	E36a	2		CAVE		1/18/06		14-I		CDT: Char
15	a1.1	Fe 1	Possible Shrine	a1	1		CAVE		1/18/06		14-I		SHR: Shri
16	a7.1	Fe 1	Charcoal Deposit	a7	1		CAVE		1/18/06		14-I		CDT: Char
17	BC10.1	Fe 1	Stationary Torch	BC10	1		CAVE		1/19/06		14-I		TCH: Torc
18	BC14.1	Fe 1	Petrel Bones	BC14	1		CAVE		1/19/06		14-I		BNE: Bon
19	BC15.1	Fe 1	Petrel Bones	BC15	1		CAVE		1/19/06		14-I		BNE: Bon
20	BC15.2	Fe 2	Petrel Bones	BC15	2		CAVE		1/19/06		14-I		BNE: Bon
21	BC16.1	Fe 1	Petrel Bones	BC16	1		CAVE		1/19/06		14-I		BNE: Bon
22	BC16.1	Fe 1	Petrel Bones	BC16	1		CAVE		1/19/06		14-I		BNE: Bon

Figure 4. Screenshot of the Site Form spreadsheet showing fields from the Sites spreadsheet in the white, grey, and blue fields.

Site Index	Name ID	Description	Count	Type	Function	Dating	Testing	Condition	Plant Comm	NRHP	Length
E16.1	Fe 1					PHS Prehistoric		G Good			
E17.1	Fe 1					PHS Prehistoric		G Good			
E18a.1	Fe 1					PHS Prehistoric		G Good			
BC2.1	Fe 1	Gourd Cradle		GDC Gourd Cradle	REP Resource Exploitation	IS Prehistoric	G Good	G Good			1.50
BC2.2	Fe 2	Upright		UPR Upright	REP Refuse	IS Prehistoric	G Good	G Good			1.50
BC3.1	Fe 1					IS Prehistoric		G Good			
BC4.1	Fe 1	Bird Bone Concentrations		BNE Bone	RNT Reinterment	IS Prehistoric		G Good			
BC4.2	Fe 2	Bone Concentrations		BNE Bone	RUP Repeated Use Occupation	IS Prehistoric		G Good			
BC5.1	Fe 1	Bird Bone Concentration		BNE Bone	TRP Transportation	IS Prehistoric		G Good			
E33m.1	Fe 1	Burned Wood		TCH Torch	WSP Workshop	IS Prehistoric		G Good			1.5
E33n.1	Fe 1	Water Concentration			REP Resource Exploitation	PHS Prehistoric		G Good			10
E36a.1	Fe 1	Burned Wood		TCH Torch	RUO Repeated Use Occupation	PHS Prehistoric		G Good			5
E36a.2	Fe 2	Burned Wood		CDT Charcoal Deposit	RUO Repeated Use Occupation	PHS Prehistoric		G Good			5
a1.1	Fe 1	Possible Shrine		SHR Shrine	CMN Ceremonial	PHS Prehistoric		G Good			25
a7.1	Fe 1	Charcoal Deposit		CDT Charcoal Deposit	RUO Repeated Use Occupation	PHS Prehistoric		G Good			3
BC10.1	Fe 1	Stationary Torch		TCH Torch	RUO Repeated Use Occupation	PHS Prehistoric		G Good			1.00
BC14.1	Fe 1	Petrel Bones		BNE Bone	RUO Repeated Use Occupation	PHS Prehistoric		G Good			15.00
BC15.1	Fe 1	Petrel Bones		BNE Bone	RUO Repeated Use Occupation	PHS Prehistoric		G Good			10.00
BC15.2	Fe 2	Petrel Bones		BNE Bone	RUO Repeated Use Occupation	PHS Prehistoric		G Good			15.00
BC16.1	Fe 1	Petrel Bones		BNE Bone	RUO Repeated Use Occupation	PHS Prehistoric		G Good			1.00
BC16.1	Fe 1	Petrel Bones		BNE Bone	RUO Repeated Use Occupation	PHS Prehistoric		G Good			10.00

Figure 5. Screenshot of the Site Form spreadsheet showing fields from the Sites spreadsheet in the white, grey, and blue fields.

Site Index	Name ID	Description	Length	Width	Height	Diameter	Axis	Dimension Unit	Station ID	Distance	Azimuth	Height	Survey Unit	X East	Y North	Z Elevation	Coord System
E16.1	Fe 1								E16				m : meters				
E17.1	Fe 1							cm: centimeters	E17				m : meters				
E18a.1	Fe 1							m : meters	E18a				m : meters				
BC2.1	Fe 1	Gourd Cradle	1.50	2.30				km: kilometers	BC2	6.00	45		m : meters				
BC2.2	Fe 2	Upright	1.50	1.50				in: inches	BC2	15.00	45		m : meters				
BC3.1	Fe 1							ft: feet					m : meters				
BC4.1	Fe 1	Bird Bone Concentrations						m: miles					m : meters				
BC4.2	Fe 2	Bone Concentrations						m : meters	BC4	15.00	280		m : meters				
BC5.1	Fe 1	Bird Bone Concentration						m : meters	BC4	20.00	240		m : meters				
E33m.1	Fe 1	Burned Wood	1.5	1	1			m : meters	BC5	3.00	293		m : meters				
E33n.1	Fe 1	Water Concentration	10	10	5			cm: centimeters	E33m	3.50	270		m : meters				
E36a.1	Fe 1	Burned Wood	5	0.5	0.5			cm: centimeters	E33n	6.00	90		m : meters				
E36a.2	Fe 2	Burned Wood	5	0.5	0.5			cm: centimeters	E36a	4.00	245		m : meters				
a1.1	Fe 1	Possible Shrine	25	20	25			cm: centimeters	E36a	6.00	200		m : meters				
a7.1	Fe 1	Charcoal Deposit	3	2				m : meters	a1	5.00	95		m : meters				
BC10.1	Fe 1	Stationary Torch	1.00	0.75	0.50			m : meters	a7	24.50	220		m : meters				
BC14.1	Fe 1	Petrel Bones	15.00					m : meters	BC10	1.50	200		m : meters				
BC15.1	Fe 1	Petrel Bones	10.00					cm: centimeters	BC14	9.00	315		m : meters				
BC15.2	Fe 2	Petrel Bones	15.00					cm: centimeters	BC15	4.50	160		m : meters				
BC16.1	Fe 1	Petrel Bones	1.00	0.50				m : meters	BC15	2.00	252		m : meters				
BC16.1	Fe 1	Petrel Bones	10.00					cm: centimeters	BC16	5.00	280		m : meters				
BC16.1	Fe 1	Petrel Bones	10.00					m : meters	BC16	1.50	260		m : meters				

Figure 6. Screenshot of the Site Form spreadsheet showing fields from the Dimension spreadsheet in yellow and Survey-Station spreadsheet fields in green.

A second procedure for data input, developed during this reporting period, was the use of the Geodatabase in ArcGIS applications. This procedure had the most potential for acceptance and use because the applications required were already in place and in use for collecting the data. This procedure used the Trimble GPS and its Data Dictionary to

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record the data in the field. The data then got downloaded in the office and a conversion was made to a shape file using Pathfinder Office. ArcCatalog was then used to import the shape file into a Geodatabase. Although these procedures were well used and accepted they were probably the most cumbersome to implement and required the most knowledge of specialized hardware and software. An import procedure document needed to be created to outline the steps for importing shape files, exported from a GPS, into a Geodatabase (see Appendix A). Ironically, although Geodatabases represented spatial data, their tables or "Feature Classes" were not necessarily interrelated and linked as a spatial database would be. Although a link could be created between common ID fields in different feature class tables within an ArcGIS project file the link could not be enforced. If a change was made to the data in the linked ID field of one of the tables in a Geodatabase the link to the other table was then broken. If the same change was made to the data in a linked ID field of one of the tables in a spatial database, the ID field in the other table was automatically updated and the link was maintained. Geodatabases were therefore good repositories for GPS and GIS data but still needed to be linked or imported to a spatial database to maintain linked table integrity. Although the Geodatabase was a nice way to work with centralized data, as with most files, it only allowed one person at a time to perform edits.

Another procedure for data input into a Geodatabase was the use of an application called Compass. This application was being used by the cave survey crews that had been collecting data during yearly lava tube surveys at PTA. Compass was used to input survey data using distance azimuth and declination. Compass was able to export the resulting surveys to a shape file. A Geodatabase called CR_PTA_Cave_Survey.mdb was created to receive those shape files. Because Compass was a specialized survey application it was unable to record any archaeological information but the survey points could be used as datum points in the Geodatabase to spatially tie in site locations for sites recorded in the lava tubes.

A third procedure for data input that was developed this season was the use of an off the shelf digital photo organization application to manage all the digital photos taken. The application Corel Photo Album 6 was selected as a data input device because it stored all its data in a Microsoft Access database file. The application also allowed the use of "key fields" to easily add predefined data to the photos. This meant that standardized data such as Type, Function, Age, etc., could be added while performing photo recordation with this application. The best part about using this kind of photo software was that it made it easy to move and edit pictures while it updated the database automatically. While this application looked promising it was only installed on a stand alone laptop computer for evaluation there for its limitations as a shared network database could not be assessed. As with the Geodatabase the resulting data from the photo database would still need to be linked or imported to a relational database for the same reasons of linked table integrity.

Finally there was some work during this reporting period on the CR_PTA.mdb database to produce a good query form. The main form in this database presented two choices which open sub forms. One sub form allowed you to query by site data and the other sub form let you create a query using project data. The two queries were linked and affected

each other's results. Within each sub form were selection sets representing some common fields related to that form. For example, the Site sub form had selection sets for Site ID, Site Type, Site Function, Training Area, and Archaeological Sensitivity Areas. Each selection set represented a summary of all data for its field in a table. One or more items could be selected in each selection set. Beside each selection set there was an option button for "and" or "or" which determined how the selection set related to the other selection sets in the query. Additionally there was a check box for "Not Like" which would determine whether the selection set was to be added or removed from the overall query. The end result was a quick and easy way to produce a complex query not usually created by most database users without some knowledge of SQL language. Although complex, the query sub form allowed query functions to be applied to each selection set as a group and not by each individual selection.

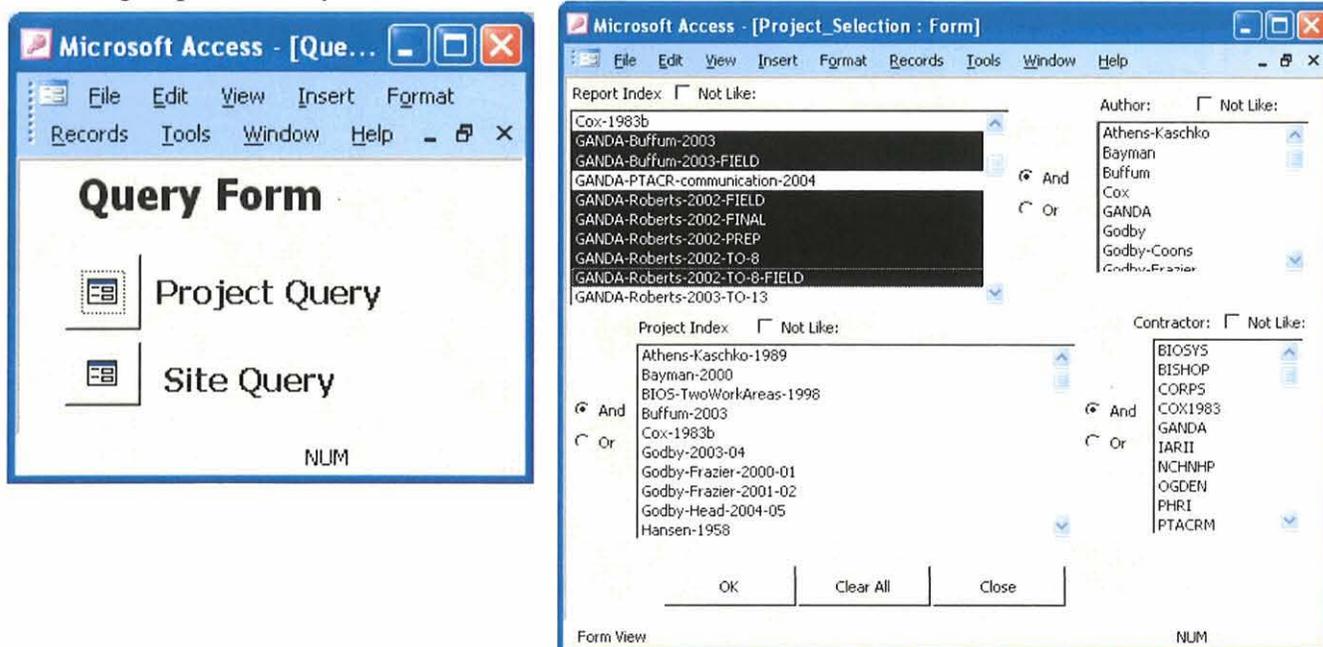


Figure 7. Screenshots of the main Query form... and the Project Query sub-form.

Microsoft Access - [Site_Selection : Form]

File Edit View Insert Format Records Tools Window Help

Type: Not Like

- Ahu
- Alignment
- Basalt quarry
- Cairn
- Chill Glass Quarry
- Complex
- Coral and shell scatter
- Coral surface scatter/militar
- Enclosure

Function: Not Like

- [empty]
- Bird nesting
- Historic Trail
- Limited-Use Occupation
- Marker
- Possible Limited-Use Occupation
- Possible Ranching
- Quarry
- Ranching fence

PROJ_ID

Selected Projects:

- Buffum-2003
- Roberts-2002
- Roberts-TO-08-2002

Not Like

Training Area:

- [empty]
- Impact Area
- TA 05
- TA 16
- TA 17
- TA 20
- TA 21

Not Like

ASA_ID:

- Outside
- ASA 04
- ASA 05
- ASA 07
- ASA 27
- ASA 29

OK

Clear All

Close

Site: Not Like

- 10220
- 10221
- 10222
- 10265
- 10266
- 10267
- 10267?
- 10268
- 10269
- 10270

Form View

NUM

Figure 8. Screenshot of the Site Query sub-form

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APPENDIX A

The following table is the help spreadsheet located in all Project.xls files and explains the purpose of each table's field. The following information is a description and instructions for recording data in the following worksheet tables.

*	All grayed cells have special coding which pulls data from other cells. You can copy-past these gray cells as you add new records to the table. It is a good idea to keep these cells grayed so that you know which cells have actual data in them and which are referencing other cells.
Pull-Down	All cells with a box outline use a pull-down list to select from.
<u>Project Worksheet</u>	
Name	: The name of the project. This Data is calculated in the Project_ID field.
Company	: Company performing the survey or writing the report. "PTA" This Data is calculated in the Project_ID field.
Date	: Start date of the survey or report. This Data is calculated in the Project_ID field.
PO	: Primary officer: The person overseeing the survey or report.
Contract_ID	: Contract ID
TO	: Task Order
Proj_id	: This field automatically creates a unique name by combining Company with project Type and Name which will be used in the database and file folder. *
<u>Reports Worksheet</u>	
Rept_Index	: Automatically creates a "Rept_Index" field by combining the "Proj_ID" and "Rept_ID" fields.
Proj_ID	: Automatically filled in from the "Proj_ID" field from the Project Worksheet
Rept_ID	: Unique abbreviation of the report title. This Data is calculated in the Rept_ID field.
Status	: Field, Prelim, Draft, or Final. This Data is calculated in the Rept_ID field.
Author_ID	: Field call sign used for ID. "14-H"
Start_Date	: The earliest recording data for the data that is being discussed in the report.
End_date	: The latest recording data for the data that is being discussed in the report. For the purpose of this database the report dates only refer to new data or data changes made since the last report in the same project.
<u>Recorders Worksheet</u>	
Recorder_ID	: Unique ID of the person collecting the data. Perhaps the company name the persons initials.

- F_Name : First Name
- M_Name : Middle Name
- L_Name : Last Name
- Title : Job Title
- Default : Select only one record by typing "-1" will fill in this recorders ID by default if "Recorder" column in any of the tables is left blank.
- D_Date : Will fill in the date for this recorders ID by default if "Date" column in any of the tables is left blank.
- D_Time : Will fill in the time for this recorders ID by default if "Time" column in any of the tables is left blank.

SiteForm Worksheet

Site_Index	: This column fills itself based on data you put into "Site_Pre", "Site_No", "Fea_ID", and "Art_ID". *
Name_ID	: This column fills itself based on data you put into "Site_Pre", "Site_No", "Fea_ID", and "Art_ID". *
Description	: Field discription.
Site_Pre	: Temporary site prefix: "T" or "MT" or "C" only if state site number doesn't exist. This Data is calculated in the Site_Index, Name_ID fields.
Site_No	: Type current state site number here if one exists otherwise type the temp number without the date. This Data is calculated in the Site_Index, Name_ID fields.
Fea_ID	: Type the feature number or letter only, like "1" or "A". This Data is calculated in the Site_Index, Name_ID fields.
Art_ID	: Type the artifact number or letter only, like "1" or "A". This Data is calculated in the Site_Index, Name_ID fields.
Category	: Select the category the site index falls under: "STATE", "TEMP", "FEATURE", "ARTIFACT", "MILITARY", or "CAVE"
OtherName	: The site, feature, or artifact ID as it would look in your notes if not like in "Name_ID" like "Pit A" or "No. 1".
Date	: Date of recording. This Data is calculated in the Site_Index, Name_ID fields.
Time	: Time of recording. A colon separator is automatically added, by typing "805" the formatting will show "8:05"
PM	: Type a "p" for all time in the 12 hour PM range, otherwise leave blank for AM or 24 hour time.
Recorder	: A pull down list from the "Recorder_ID" column in the Recorder worksheet. Automatically repeats after you fill in the first cell. *
Notes	: Field notes.
Typology fields in blue	
Count	: Number of items if record represents more than 1.
Type	: A pull down list of Type.
Function	: A pull down list of Function.
Dating	: A pull down list of Dating.
Testing	: A pull down list of Testing.

Condition	: A pull down list of Condition.
PlantComm	: A pull down list of Plant Community.
NRHP	: A pull down list of NRHP.
Dimensions fields in yellow	
Length	: Length Measurement, usually the longest
Width	: Width measurement
Height	: Height Measurement
Diameter	: Measurement as dictated by the "DIM_ID" column.
Axis	: Angle of longest measurement
Dimension_Unit	: A pull down list of measurement unit ID's. *
Survey fields in green	
Datum	: A pull down list from the "Station_ID" column in the Station worksheet. *
Station_ID	: Station Identification
Distance	: Distance measurement
Azimuth	: Compass angle from true north
Height	: Height Measurement
Survey_Unit	: A pull down list of measurement types. *
X_Easting	: X-axis or easting
Y_Northing	: Y-axis or northing
Z_Elevation	: Z-axis or elevation
CoordSystem	: The coordinate system that the data is in. default is UTM NAD 83 Zone 5
Site_Index	: A pull down list from the <i>Site_Index</i> column in the Sites worksheet.
Name_ID	: The Name of the file as it appeared in the camera. This column fills itself based on data you put into the <i>Prefix1</i> and <i>Incr</i> fields. *
FileName	: The Name of the file including the extension. This column fills itself based on data you put into the <i>Prefix1</i> , <i>Prefix2</i> and <i>Incr</i> fields. *
Prefix1	: Common prefix for all photos as assigned by camera, if any. Automatically repeats after you fill in the first cell. *
Incr	: Automatically increments from the number you put in the first cell. *
Prefix2	: Common prefix for all photos after downloading if changed from assigned camera prefix, otherwise blank. Automatically repeats after you fill in the first cell. *
FileType	: The file extension for the photo. Automatically repeats after you fill in the first cell. *

Time : Time photo is taken. Don't fill in; this data is extracted from the picture file.

Date : Date photo is taken. Don't fill in; this data is extracted from the picture file.

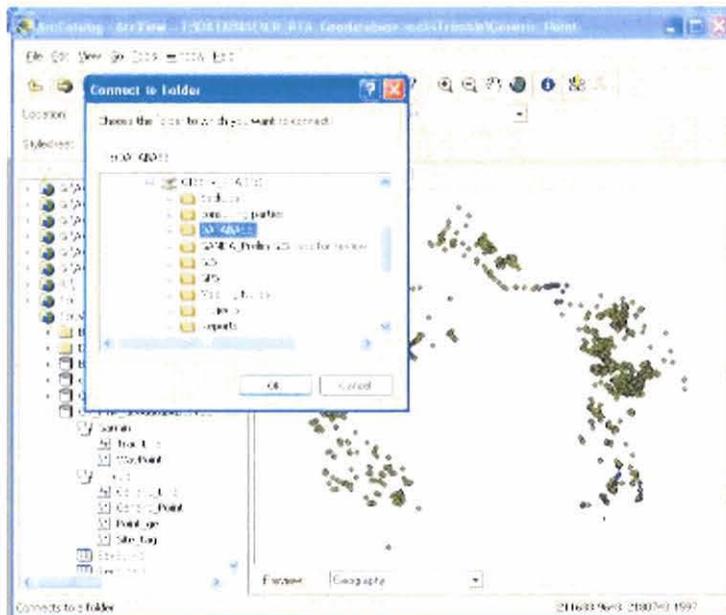
Recorder	: A pull down list from the "Recorder_ID" column in the Recorder worksheet. Automatically repeats after you fill in the first cell. *
Direction	: A pull down list of compass directions.

Description : Official photo description as seen in a report.

Notes : Extra photo notes that pertain to the particular site, feature, or artifact.

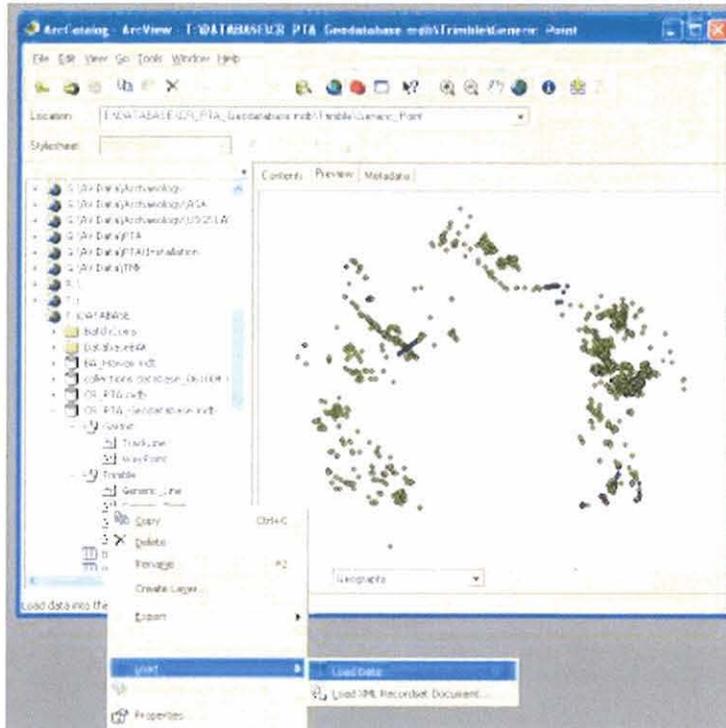
Importing Shape files from Pathfinder Office into the PTA Geodatabase

The following help information is from the document T:\Database\CR_PTA_Geodatabase Import Help.doc and pertains to the CR_PTA_Geodatabase.mdb file in the same directory. The following tutorial assumes that you have already exported point data from one or more Trimble rover file(s) to shape file(s) format using the Pathfinder Office application. The point data should be collected using the PTA data dictionary.

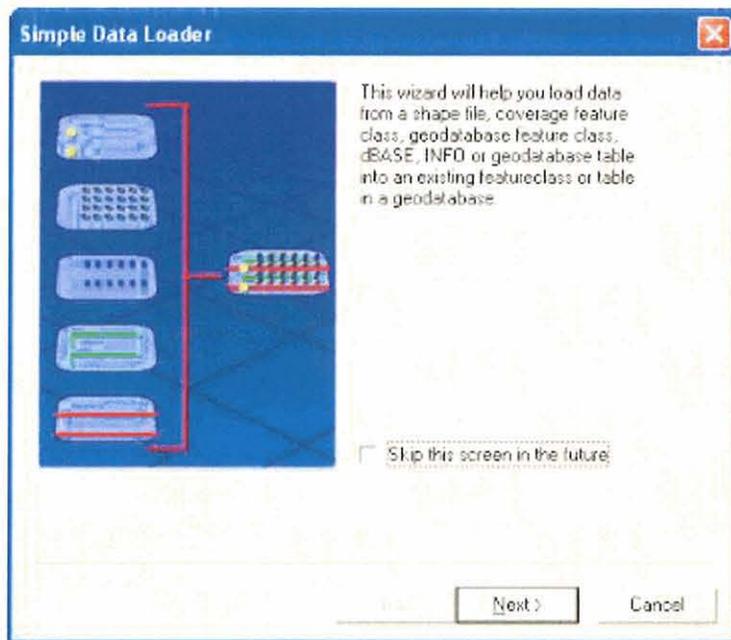


Open ArcCatalog and navigate to T:\DATABASE\ and then select CR_PTA_Geodatabase.mdb in that folder.

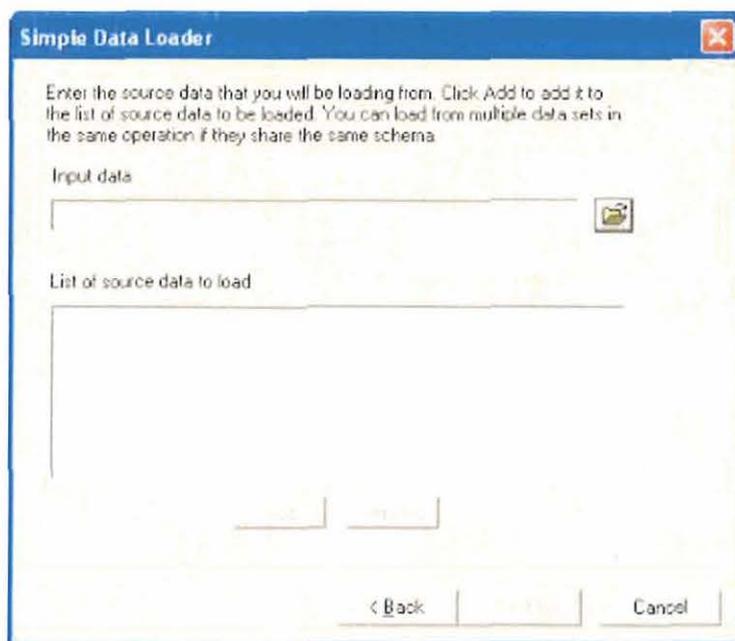
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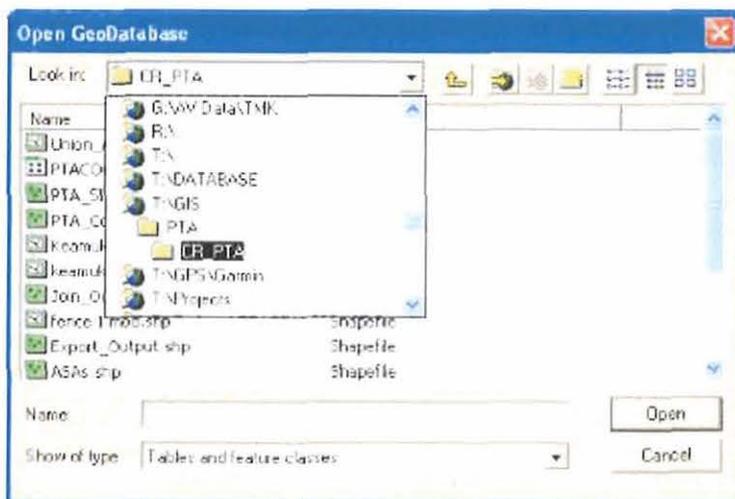
Within the CR_PTA_Geodatabase.mdb file navigate to the GPS_Data Dataset and right click on the Point_Features Feature Class and select *Load/Load Data....* on the pull-down menu to open the Simple Data Loader Wizard.



Select next for the Input data window.

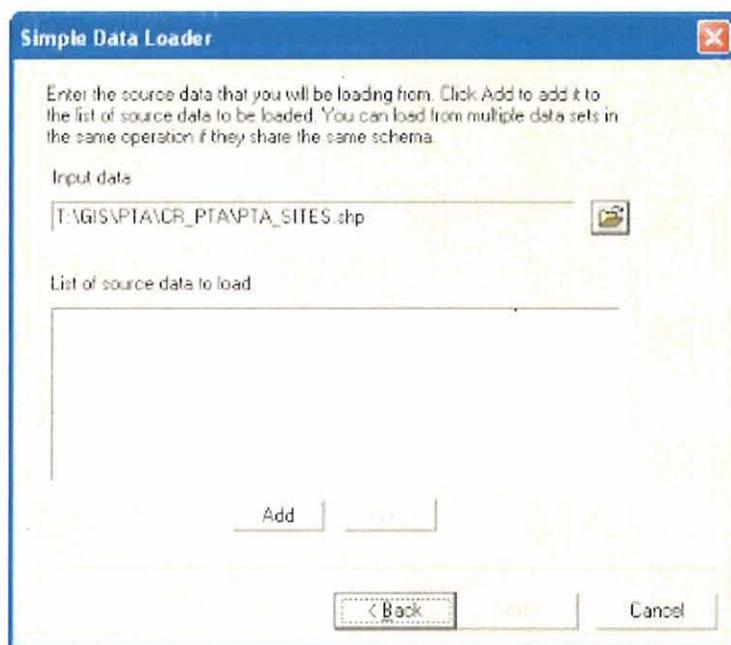


Select the open-folder icon.

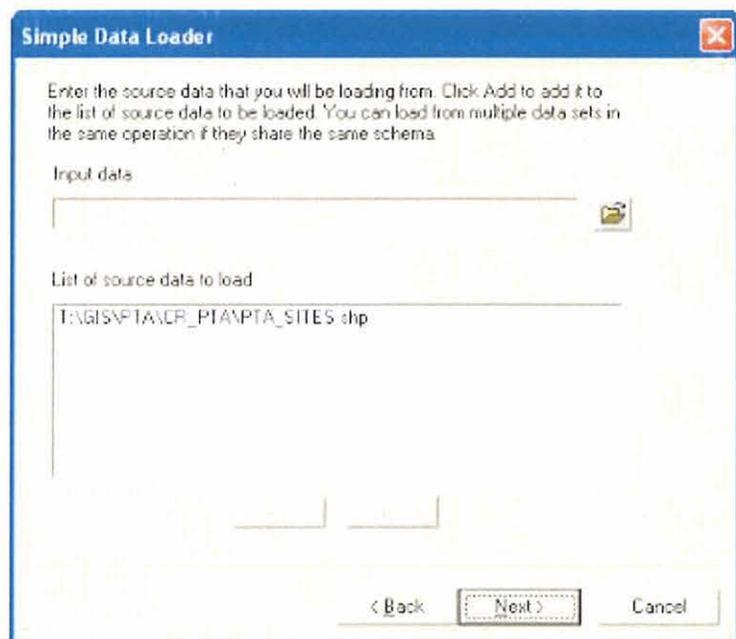


Navigate to the Shape file which has the Trimble point data that you exported from the Pathfinder Office application. Don't forget that the data being brought into the Generic_Point Feature Class should have originated from Trimble points using the PTA Data Dictionary.

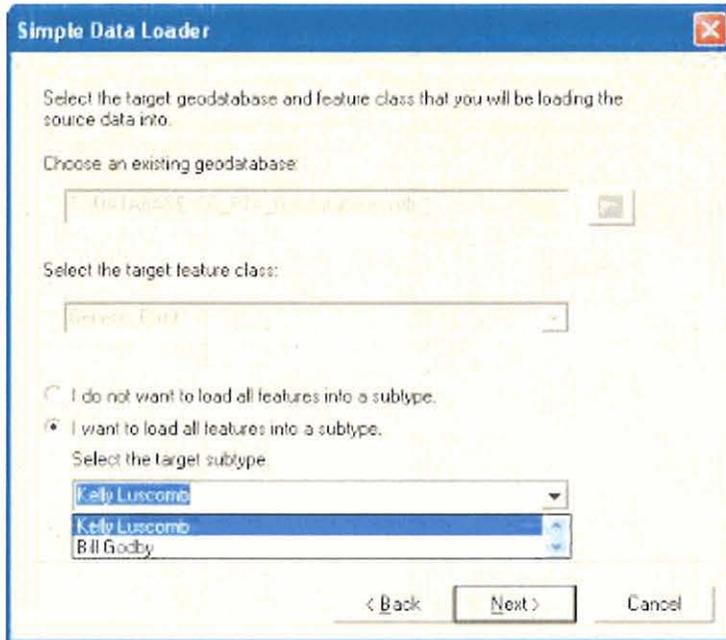
December 5, 2008



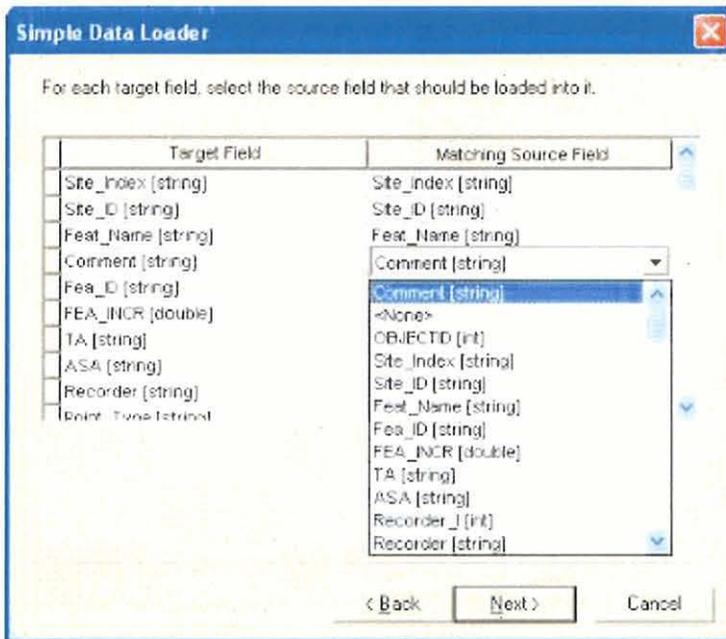
Click the Add button.



The shape file will show up in the “List of source data to load” window. At this point you can add more shape files to be loaded or click the Next button to continue to the Subtype field selection window.



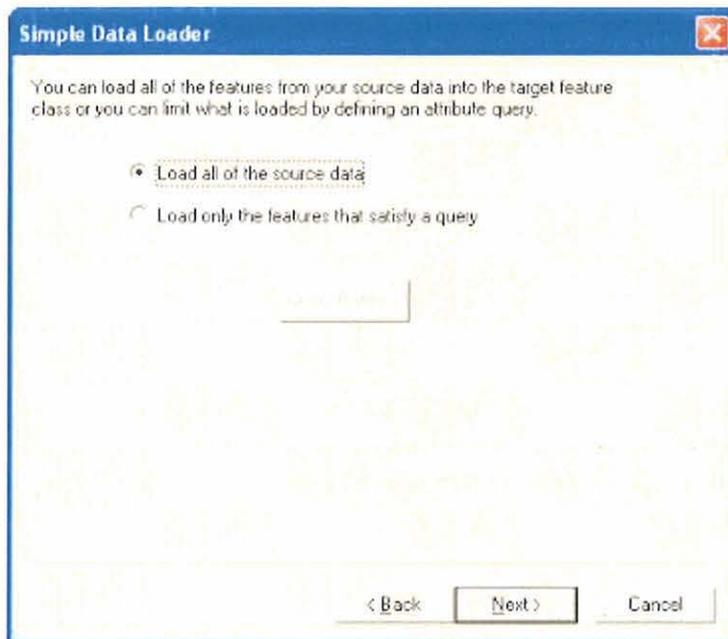
If the data you have selected was collected by one particular field crew member and that crew member is on the subtype list then you can select “I want to load all features into a subtype.” and then select the crew member from the subtype list otherwise select “I do not want to load all features into a subtype.” if the data was collected by more than one person. Select Next to continue to the Field Matching window.



The field matching window shows the fields from the Generic_Point feature class in the left column and the matching fields from the data to be imported on the right column. If the field names are not the same the field cell in the right column will be blank. If the

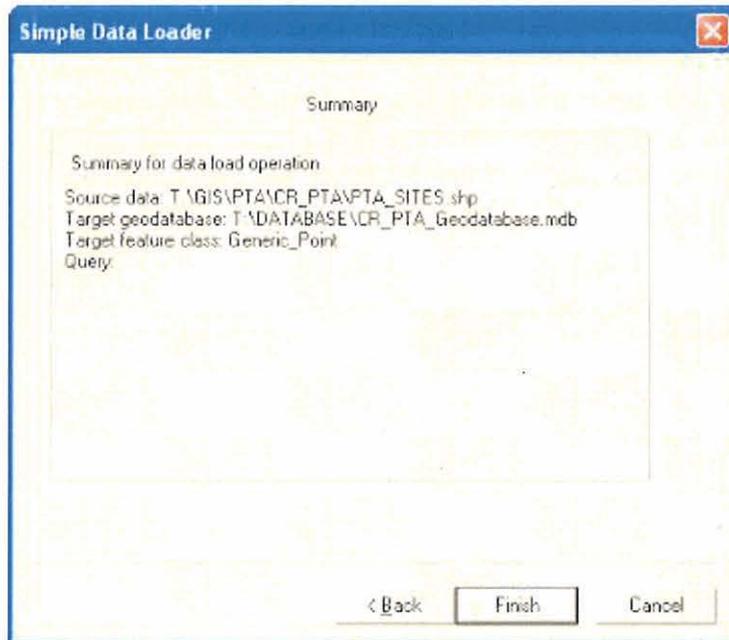
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PTA data dictionary was used to collect the points then all the fields should match with the Generic_Point feature class. If the source fields don't match then you can manually join the fields by selecting from a pull-down list of field names from the blank source cell on the right. It is important that the data types (the names in parenthesis: string, int, double) are the same when manually matching field names. When finished matching click Next to continue.



Select "Load all of the source data." and click Next.

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Click Finish to continue importing the data. A message will appear when the import is finished telling you how many records imported successfully and how many, if any, did not. Import errors can be due to data type mismatch between the source and the target fields or the point falls outside of the coordinate range (domain extents) set in the Trimble Feature Dataset.