

DRAFT ENVIRONMENTAL ASSESSMENT

for

CONSTRUCTION and PUBLIC USE

of the

ALA PĀLĀ‘AU PROJECT

PĀLĀ‘AU STATE PARK, MOLOKAI

Department of Land and Natural Resources
Division of State Parks

December 2009

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INTRODUCTION

In November 2008 Ke ‘Aupuni Lōkahi, Inc., a non-profit on the island of Molokai, received a Natural Resources grant from the Hawai‘i Tourism Authority to complete a comprehensive plan to improve the natural and cultural resources in Pālā‘au State Park, Molokai. Named Ala Pālā‘au, the objectives of the proposal were to restore native forest habitat and rare species in the area, improve views of Kalaupapa peninsula and the cliffs of the northern coast of Molokai, and provide interpretation and education of these unique natural and cultural resources. The initial concept of the project was aimed to benefit the Molokai community by improving the park while providing education, conservation, and employment opportunities. The vision of the project is to provide a place-based learning experience where local schools, community members, and interested visitors can come to learn about Molokai's rich biological and cultural heritage. This project will provide a hands-on educational experience that encourages pride in Pālā‘au State Park's resources and highlights the importance of preserving Molokai's native species and ecosystems while teaching about the role they play in Hawaiian culture.

Ala Pālā‘au is a partnership between the Molokai community, Ke ‘Aupuni Lōkahi, adjacent Kalaupapa National Historic Park (KNHP), National Park Service Rivers, Trails, and Conservation Assistance Program (RTCA), Wiliwili Hawaiian Plants, State of Hawai‘i, Department of Land and Natural Resources (DLNR) Division of State Parks (PARKS), and State of Hawai‘i, Department of Hawaiian Home Lands (DHHL). Community feedback was gathered over a series of five community meetings held between January and September 2009. Additionally, feedback was gathered at a teacher's workshop held in May 2009 at the park, at Hawaiian Homesteader's Association meetings held during the summer of 2009, and a Kalaupapa Patients meeting in September 2009. The ideas expressed at these meetings have directed the development of the project and are reflected both in this document and the comprehensive management plan (CMP). Other partners include KNHP and RTCA, both of whom are providing in-kind technical services for the project, while Wiliwili Hawaiian Plants, owned and operated by Bill Garnett, has been contracted to produce the biological survey for this assessment as well as the native plant restoration plan for the CMP. Although not actively involved in the planning, DHHL owns the land which is leased by Parks. Both agencies have been informed of the project and support the idea of the trail. Four of these entities (KAL, KNHP, PARKS, and DHHL) are in the process of entering into a Memorandum of Understanding (MOU) for the purpose of formally establishing their roles during project planning and implementation.

Summary

Project Name:	Ala Pālā‘au
Proposing Agency:	State of Hawai‘i Department of Land and Natural Resources Division of State Parks
Approving Agency:	State of Hawai‘i Department of Land and Natural Resources Division of State Parks

Location: Pālāʻau State Park, District and Island of Molokai

Tax Map Key: 5-2-013-006-0000

Property Owner: State of Hawaiʻi
Department of Hawaiian Home Lands

Property Lessee: State of Hawaiʻi
Department of Land and Natural Resources
Division of State Parks

Land Use Designation: Conservation District, Resource Subzone

Agencies Consulted: State
Department of Health
Office of Environmental Quality Control
Department of Hawaiian Home Lands
Division of Land Management
Department of Land and Natural Resources
Historic Preservation Division
Forestry and Wildlife Division, Na Ala Hele

County
Planning Department
Molokai Planning Commission

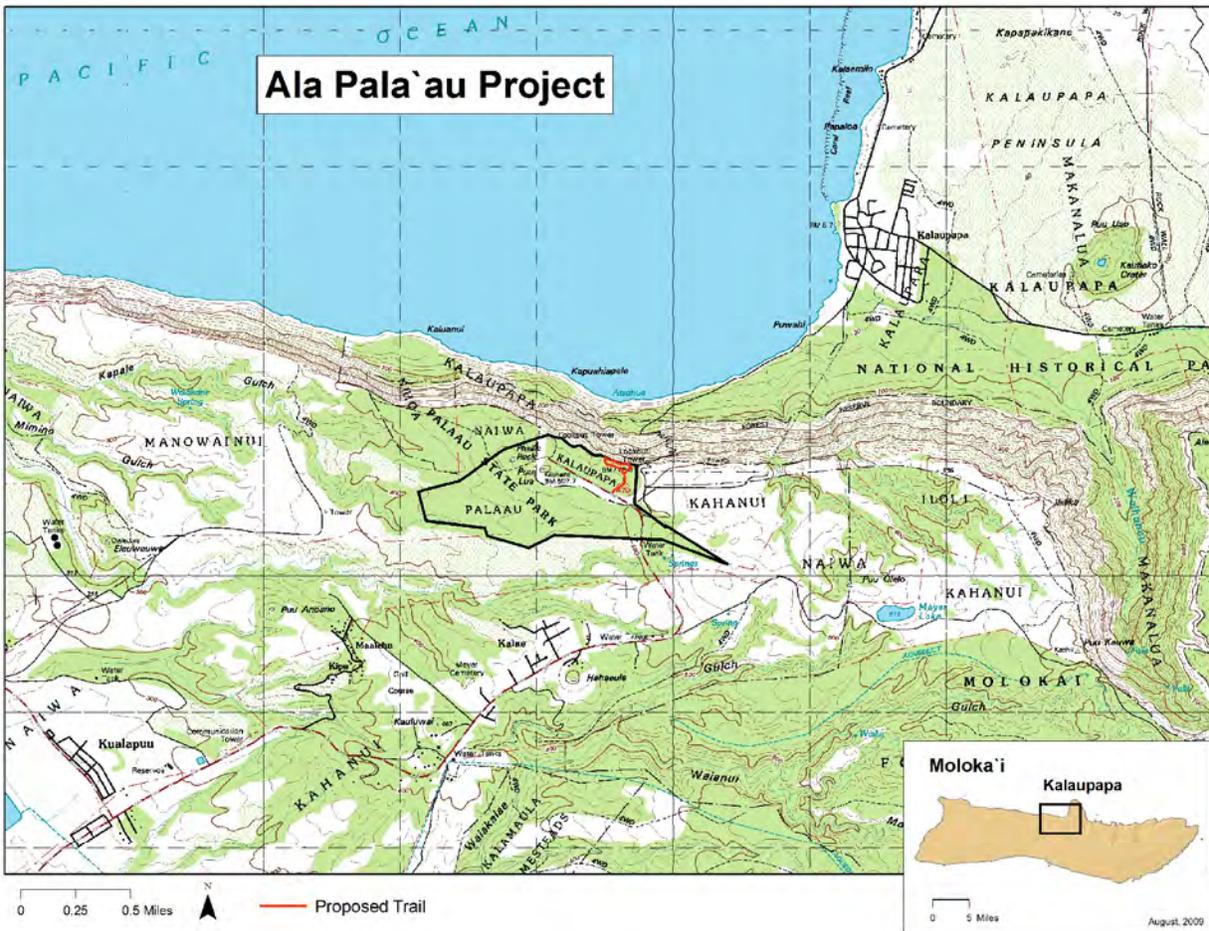
Federal
National Park Service

Other
RW Meyer Ltd.
Miala Inc.
Molokai Ranch Inc.
Molokai Land Trust
Wiliwili Hawaiian Plants

SITE INFORMATION

The proposed project site is located within the Pālāʻau State Park, which is centrally located on the northern coast of Molokai in the District of Molokai, Tax Map Key 5-2-013-006-0000 (Figure 1). The entire project area is in the Resource Subzone of the Conservation District. The Park is included in the Molokai Forest Reserve, located in the upland area southwest of Kalaupapa peninsula. Pālāʻau State Park is owned by the Department of Hawaiian Home Lands and managed under a license agreement by the State Department of Land and Natural Resources, Division of State Parks. The park is approximately 233.68 acres and represents the only State Park on the island of Molokai.

Figure 1. Location of Pālāʻau State Park and project site.



The parcel was originally designated Hawaiian Homestead lands by the Hawaiian Homestead Commission Act of 1920. In 1929, the land was turned over to the Board of Commissioners of Agriculture and Forestry and became a forest reserve. In the late 1930s a tree-planting program was begun to revegetate the area, which had been denuded by decades of cattle grazing. Plantings consisted largely of non-native **Eucalyptus**, **Melaleuca**, and **Casuarina** species, which dominate the landscape today. In 1955 the parcel was established as a Territorial Park because of its scenic and historic values. The park’s bluffs provided an accessible vantage point to view Kalaupapa peninsula and the dramatic cliffs of the northern coast of Molokai. In 1984, the parcel was returned to the Department of Hawaiian Home Lands by executive order. Neighboring property owners include RW Meyer Ltd. and Miala Inc. (both corporations of the RW Meyer family) on the South and East, Molokai Ranch Inc. on the West, and KNHP on the North. All of these entities have been informed about the project and included in the planning process.

Pālāʻau State Park has a number of facilities including a pavilion, camp ground, picnic area, two parking lots, restrooms, and an overlook of the Kalaupapa peninsula. Two short walking trails are in the park. One approximately 200 yards in length that provides access via a dirt walking path to Kaule o Nānāhoa (the Phallic Rock), and a second concrete path that is ADA accessible that provides access from the overlook parking lot to the Kalaupapa overlook. Additionally, the

Kalaupapa Pali Trail, which provides access to Kalaupapa peninsula, begins along the Northeast boundary of the park in property owned by Miala, Inc.

THE TRAIL

Ala Pālā‘au is intended as a place-based educational project focusing on cultural and natural resources in the area. A trail will provide access to native plant restoration sites and interpretive material. The planned trail is approximately 0.5 of a mile long and will be accessed roughly two miles up from Farrington Avenue off Kalae Highway (Figure 2). The trail will begin across Kalae Highway from the Pālā‘au State Park pavilion and run northward down and up a small drainage. The trail will then follow the northeastern rim of this drainage until it reaches the pali. Along the pali there will be a short loop to incorporate two small overlooks before doubling back to the original trail route. This route was chosen for its variety of microhabitats (ex. riparian, pali), which offer a range of appropriate planting sites to various native plant species. Intended to be no more than a footpath for novice to medium-level experienced hikers, the planned trail will be considered a wildland trail 2-3 feet wide and intended for pedestrian use only. All wheeled vehicles, horseback riding, and other non-pedestrian uses will be prohibited. The trail is for daytime recreational use only and overnight camping on or along the trail will not be allowed.

GENERAL DESCRIPTION OF THE TECHNICAL ACTIONS AND SOCIO-ECONOMIC CHARACTERISTICS

Technical Actions

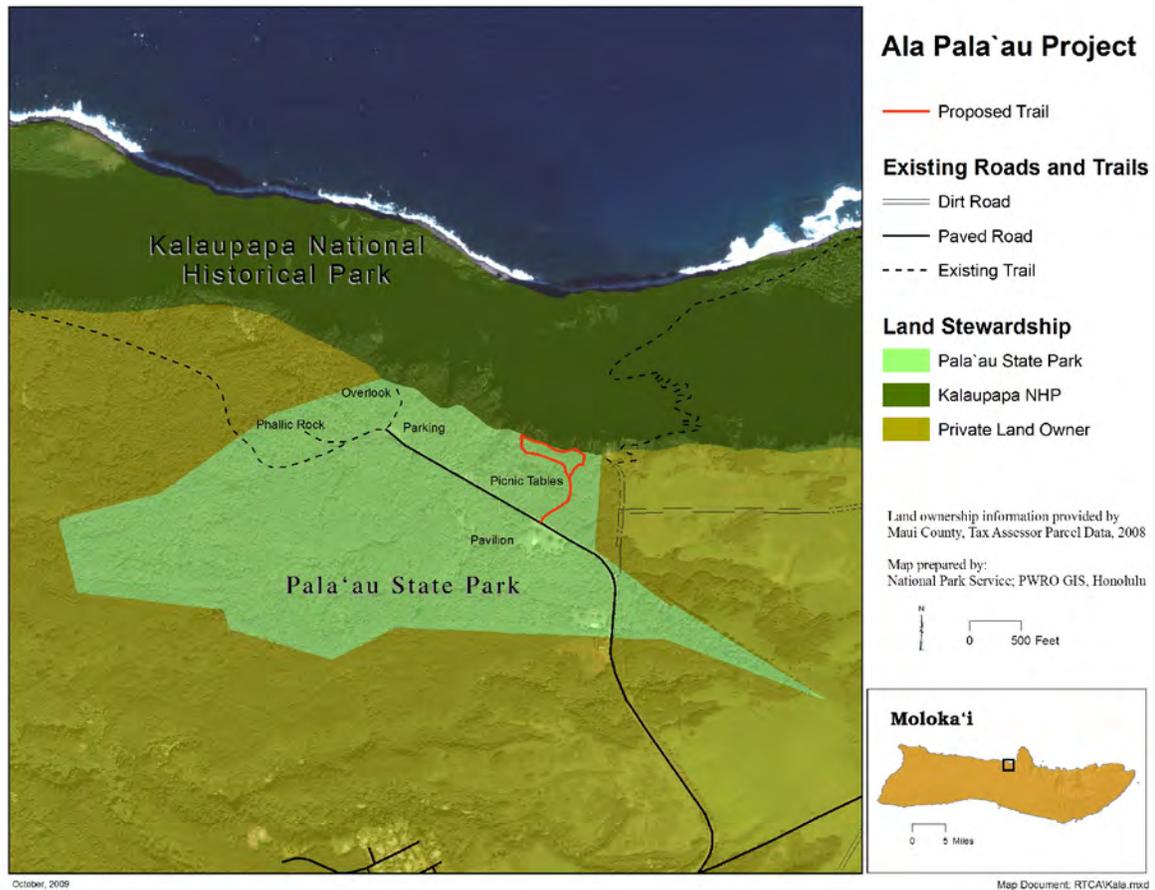
The project will be completed over four stages. Construction and planting (Stages One through Four) will depend on the amount of funds available.

Stage One: The first stage has been completed by Bill Garnett with Wiliwili Hawaiian Plants, Erika Stein with KNHP, and Dr. Davianna McGregor. This initial stage involved a biological survey done by Bill Garnett, an archeological site survey of the trail corridor done by Erika Stein, and a cultural impact assessment by Dr. McGregor (see **Flora, Fauna**, and Appendix A). This work identified native elements and sensitive areas. Lastly, flagging of the proposed trail route was done.

Stage Two: The second stage consists of defining the trail corridor with markers and very limited removal of non-native and, possibly, native vegetation and debris from the planned trail bed. These actions will reveal and define the extent and course of the trail bed. It will also uncover any additional threatened, endangered or rare plants, archeological sites or historic materials missed during Stage One of the project. If any of these sensitive elements are found, trail construction will stop immediately and the appropriate authorities will be notified.

Stage Three: The third stage will involve supervised removal of denser vegetation along the trail and planting sites and construction of the access trail. The Division of Forestry and Wildlife Best Management Practicing for Maintaining Water Quality will be incorporated into all construction activities as applicable (Appendix B). Removing larger shrubs and trees in the area will require the use of specialized equipment such as chainsaws and wood chippers. Larger trees will be used as trail boundaries and smaller brush will be chipped and used as mulch in the planting areas. Little ground

Figure 2. Neighboring land stewardship and location of proposed trail route.



disturbance is anticipated in the construction of the trail; however, digging in certain areas will be required to ensure that the trail bed is level and secure. The trail will be cut to a grade no more than 10 percent in order to minimize erosion. Trail construction will utilize materials immediately adjacent to the trail. The trail will have an earthen floor. A log bridge will be constructed so that users can safely cross the drainage. The bridge will be made out of a felled log that has been flattened on top, notched, and secured to a footing. The bridge will be approximately 4 feet wide and will have handrails. Short-lived systematic herbicides may sometimes be used along the trail. Label use of Roundup (Isopropyl amine salt of Glyphosate) and Garlon 3A (Triclopyr) on cut stumps may be employed.

Stage Four: The fourth stage involves constructing the guardrails at the scenic overlooks, outplanting native plants and culturally significant non-native plants in appropriate areas, erecting temporary plastic fencing around the planting sites to keep feral ungulates out of these areas, and erecting interpretive signs. Guardrails will be approximately 50 feet long and constructed out of 4x4 redwood posts dug into the ground and 2 x 6 redwood planks attached laterally.

Maintenance of the trail and restoration sites is an important component of long-term success of this project. Monthly brushing of vegetation, weeding and fertilizing plantings, clearing of debris, removal of trash, spot-restoration of trail structures, and maintenance of interpretive and informational trail signs will comprise the routine maintenance program. The goal of the project is

that volunteer labor will do much of this work. Should the volunteer group not be able to complete these maintenance responsibilities, however, KNHP has agreed to provide staff to perform these duties.

Socio-Economic Characteristics

The establishment of the proposed native plants, interpretive signs, and access trail for public use is not expected to have any economic effects on Pālā‘au nor Molokai as a whole. Although the Division of State Parks allows certain commercial activity to occur by permit on particular trails, Ala Pālā‘au is not intended for such use. The intent of the project is to provide residents and visitors with a hands-on educational experience that may foster knowledge, appreciation and respect for Molokai’s natural and cultural resources. The volunteer group that is being cultivated to take on a variety of efforts from educating other users to construction, plantings, and maintenance responsibilities will undoubtedly gain a feeling of accomplishment from this public service. Similarly, local school groups helping with native species restoration will also benefit from this environmental and cultural service.

Grant opportunities from public and private agencies will be sought to bear the majority of the costs necessary to establish the project. The estimated costs for labor and materials for all phases of the project are roughly \$150,000.000. A volunteer labor force comprised of interested community members, summer youth programs such as AmeriCorp and the Hawai‘i Youth Conservation Corp, in addition to potential in-kind assistance from project partners will help reduce some of this expense.

SUMMARY DESCRIPTION OF THE AFFECTED ENVIRONMENT

The proposed project site is located within the Pālā‘au State Park, which is accessed off Kalae Highway approximately two miles up from Farrington Avenue. The highest elevation of the Park is Kilohana at 1665 meters above sea level. The site usually enjoys clear weather, although it is not uncommon for clouds to build up in the afternoon, and for light or persistent rain to occur. Storms usually occur in the winter months contributing to 40 to 60 inches of rainfall annually. Owing to the area’s elevation, nights are generally cool any time of the year, and temperature ranges from 65 to 80°C (Juvik and Juvik, 1998, Atlas of Hawaii). Winds originate predominately from the East-northeast for a majority of the year, but may occasionally blow from the South-southwest during “Kona” conditions. The topography of the area is fairly level with the exception of a few pu‘u’s and one large, unnamed drainage. There are no perennial streams in the area.

Public Utilities

There are public restrooms in the park located at the pavilion, campgrounds, and Kalaupapa overlook access walkway. These restrooms are available only during the daytime. Additionally, there are outdoor sinks in varying degrees of disrepair at the campgrounds and pavilion. There are no plans to install any more utilities for the purpose of the Ala Pālā‘au Project.

Public Access and Parking

The planned trail is accessible year-round by following the Kalae Highway from Kualapu‘u town. The proposed trailhead is directly off Kalae Highway at the Pālā‘au State Park pavilion. The park is

open 24 hours a day allowing access to the trail; however, the trail is intended for day time use only and access during the night time hours is not advisable. Parking for the proposed trail is located at the pavilion parking lot, which has 12 stalls, one of which is a handicap stall.

Flora

The planned trail passes through a plantation forest made up of a variety of introduced species and very few native species. No threatened or endangered species were found along the flagged trail route or within the entire park during the botanical survey. Additionally, no sensitive habitats were found during the survey. Plant species observed within the park and along the entire trail course are listed below.

Non-native:

Eucalyptus robusta (Swamp mahogany)
Eucalyptus saligna (Sydney blue gum)
Eucalyptus citriodora (Lemon gum)
Ficus microcarpa (Strangler fig)
Ficus elastic (Rubber tree)
Melia azedarach (Pride of India)
Casuarina equisetifolia (Ironwood)
Araucaria columnaris (Cook Pine)
Psidium cattleianum (Strawberry Guava)
Pterocarpus cf. indicus (Narra)
Psidium guajava (Yellow Guava)
Spathodea campanulata (African Tulip)
Thevetia peruviana (Be Still)
Wedelia trilobata
Taraxacum officinale (Dandelion)
Citharexylum caudatum (Fiddle Wood)
Acacia confusa (Formosan Koa)
Solanum capsicoides (Kikania)
Schinus terebinthifolius (Christmas Berry)
Melaleuca leucodendron (Paper Bark)
Panicum maximum (Guinea Grass)
Sida rhombifolia
Malva parviflora (Cheese Weed)
Lythrum martitimum
Centaurium erythraea
Indigofera suffruticosa (Indigo)
Sonchus oleraceus (Pulele)
Synedrella nodiflora
Hypochoeris glabra
Gnaphalium purpureum (Cudweed)
Emilia sonchifolia (Floras Paintbrush)
Conyza bonariensis (Hairy Horseweed)
Bidens pilosa (Spanish Needle)
Ageratum conyzoides (Maile Honhono)

Ageratina adenophora (Maui Pamakani)
Schefflera actinophylla (Octopus tree)
Desmodium incanum (Ka'imi)
Crotalaria pallid (Rattlepod)
Lepidium virginicum (Mustard Cress)
Coronopus didymus (Swine Cress)
Hydrocotyle verticillata (Pohe)
Justicia betonica (White Shrimp Plant)
Asplenium nidus ('Ekaha, Bird's Nest Fern)
Blechnum appendiculatum
Cyrtonium falcatum (Holly Fern)
Elaphoglossum crassifolium
Nephrolepis exaltata (Ni Ani Au)
Phymatosorus grossus (Laua'e)
Digitaria insularis (Sour Grass)
Vicia sp.
Leucaena leucocephala (Koa Haole)
Oplismenus hirtellus (Basket Grass)
Oxalis corymbosa (Pink Wood Sorrel)
Phytolacca octandra
Plantago major (Laukahi)
Aleurites moluccana (Kukui)
Cyperus rotundus (Nut Grass)
Commelina diffusa (Honohono)
Stachytarpheta jamaicensis (Owi)
Passiflora subpeltata (White Passion Flower)
Syzygium cumini (Java Plum)
Polypodium aureum (Rabbit's Foot Fern)
Cynodon dactylon (Bermuda Grass)
Kyllinga brevifolia
Cyperus gracilis (McCoy Grass)
Cyperus rotundus (Nut Grass)
Verbena litoralis (Owi)
Lantana camara (Lantana)
Trema orientalis (Gunpowder Tree)
Turnera ulmifolia (Yellow alder)
Solanum capsicoides (Kikania)
Flindersia sp.
Grevillea robusta (Silky Oak)
Pityrogramma chrysophylla (Gold Fern)
Rubus rosifolius (Thimble Berry)
Tabebuia rosea (Pink Techoma)

Native:

Psydrax odoratum (Alahe'e)
Carex wahuensis subsp. *wahuensis*
Carex meyenii

Metrosiderous polymorpha (Ohi'a Lehua)
Wikstromea oahuensis (Akia)
Styphelia tameiameia (Pukiawe)
Doodia kunthianum
Acacia koa (Koa)
Microlepis strigosa (Palapalai)
Psilotum nudum (Moa)
Fimbristylis dichotoma
Solanum americanum (Popolo)
Pilea peploides
Dicranopteris linearis (Uluhe)
Psychotria mariniana (Kopiko)
Ophioglossum sp.

Fauna

A variety of nonnative birds and mammals occur within the park. The only native Hawaiian species known to occur in the area are the Hawaiian Hoary Bat (**Lasiurus cinereus semotus**) and the Pacific Golden Plover (**Pluvialis fulva**), which is a winter visitor.

Nonnative bird species observed in the project area include:

Acridotheres tristis (Common Myna)
Gallus gallus domesticus (Chicken)
Carpodacus mexicanus (House Finch)
Cettia diphone (Japanese Bush-warbler)
Zosterops japonicus (Japanese White-eye)
Cardinalis cardinalis (Northern Cardinal)
Lonchura punctulata (Nutmeg Mannikin)
Leiothrix lutea (Red-billed Leiothrix)
Phasianus colchicus (Ring-necked Pheasant)
Streptopelia chinensis (Spotted Dove)
Copsychus malabaricus (White-rumped Shama)
Geopelia striata (Zebra Dove)

Nonnative mammals observed or known to occur in the project area:

Felis catus (Feral cat)
Herpestes auropunctatus (Mongoose)
Mus musculus (House mouse)
Rattus spp. (Rat)
Sus scrofa (Feral pig)
Axis axis (Feral deer)

Historical/Archeological and Cultural Sites

A cultural impact assessment (CIA) was conducted by Dr. Davianna McGregor for the Ala Pālā‘au project in the ahupua‘a of Pālā‘au and the full report is included as Appendix A. The archeological survey for this report was done by Erika Stein with KNHP. The CIA determined that the primary cultural sites in the Pala‘au State Park area comprise the Nānāhoa Complex. These include the male phallic stone (SIHP #50-30-06-0001); more than 24 petroglyphs (SIHP# - 002); a holua slide (SIHP#-003); and a female phallic stone (SIHP # - 004). The proposed project area, located near the entry to the park, is far away from this complex, and based on past and present archeological studies and oral history sources, the project area itself is not known to have any specific traditional cultural sites. The assessment also identified that the park is accessed for traditional and customary gathering of native plants for cultural, spiritual and healing purposes. The proposed project will enhance native plant communities in the park. Additionally, the assessment determined that while the southwestern portion of the park is accessed for traditional and customary subsistence hunting, the project area is not.

Hawai‘i Revised Statutes (HRS) law will be followed in developing and managing the project and associated trail. If any historical sites, burials, artifacts or other structures are found on or within sight of the trail or plantings, all appropriate parties will be notified immediately, and trail construction will stop. If necessary, appropriate management and mitigation measures will be taken immediately.

Adjacent Natural Resources

Striking scenic views of Kalaupapa peninsula and the northern coastline of Molokai dominate the North boundary of the park and project users will have access to these views. Additionally, the park is adjacent to the Kalaupapa Pali Trail, which provides access to the peninsula. Along the beginning (i.e. top) of the Pali Trail, Bill Garnett, working with KNHP, has begun native plant restoration work, focusing on Molokai endemics where appropriate. Species used in these efforts include: **Canavalia molokaiensis** (awikiwiki); **Hibiscus arnottianus** subspecies **immaculatus** (Kokio keokeo); **Brighamia rockii** (Alula).

There is an unnamed drainage in the park that the proposed trail will cross. The drainage is not a perennial stream, but does experience occasional freshets. Additional resources include exotic tree species planted in the 1930’s and 40’s for erosion control and wood production. Although DLNR has not expressed interested in harvesting and replanting these tree, if they ever did, it may affect recreational opportunities and will require some type of mitigation.

Sensitive Habitats

The biological surveys did not find any threatened or endangered species within the project area or the entire park. Despite this, special attention will be paid when constructing the section of the trail that runs through the drainage so as not to promote erosion. DOFAW’s best management practices will be adhered to during construction (See Appendix B).

IDENTIFICATION AND SUMMARY OF MAJOR IMPACTS AND ALTERNATIVES CONSIDERED

Major Positive Impacts

The vision of the Ala Pālā‘au project is to provide a place based learning experience where local schools, the general public, community members, and interested visitors can come to learn about Molokai's rich biological and cultural heritage. The project will provide a hands-on learning experience that encourages pride in Pālā‘au State Park's resources and highlights the importance of preserving Molokai's native species and ecosystems while teaching about the role they play in Hawaiian culture. The project aims to remove non-native tree species that currently dominate the area, and to replant significant portions of the area with site specific and appropriate native Hawaiian plant species. Interpretive signs located at these restoration sites would teach users about these species and the significant roles they play in Hawaiian culture. Improved understanding by the greater community of Hawaii's resources is critical to their continued survival. This project aims to educate users about these fragile and unique resources.

The project is located adjacent to KNHP and, if implemented, will provide additional views and educational/interpretive signage of Kalaupapa peninsula. Given that there is limited access to KNHP, the project will provide a place for people to learn and observe the legacy of Kalaupapa, while not impacting the patients and their lives.

Central to the long-term success of the project is the development of a volunteer stewardship group that would take on various management and maintenance responsibilities. Having an organized group with a vested interest in the project and surrounding area would promote the interpretive context of the project and also an appreciation of the setting for trail users.

Major Negative Impacts

The construction of the proposed access trail is likely to attract more people to the park. It is possible that as more trail users visit the area, associated impacts will occur. The impacts associated with increased public use of the park may include vandalism, littering, fires, commercial activity, and the spread of invasive species. However, regular maintenance, volunteer stewardship, and appropriate signage will hopefully help reduce these potential impacts.

A concern that the project won't be maintained has been expressed by the community. As outlined in the technical aspects of this assessment, maintenance will be the responsibility of the volunteer group. Should that group not be able to fulfill their maintenance responsibilities, however, KNHP will assume all maintenance duties (see Technical Actions for maintenance tasks and responsibilities).

The illegal use of motorcycles and ATVs on the trail has been another concern of the community's. Signs barring use of off-road motorized vehicles will be posted at the trailheads. If necessary, physical barriers such as rocks and logs will also be installed to prevent access to unwanted modes of transportation. Regular maintenance and the presence of volunteer stewards will likely help to reduce the potential impacts of this activity; however, there is the potential obligation of state funds, and increased State regulatory issues associated with potentially unacceptable and evolving types of public recreational and commercial use.

Construction of the trail may promote soil erosion through the loss of protective roots and leaf litter for a period of time. However, erosion is believed to be minimal given that a majority of the trail is

level, the trail floor is only three feet wide, and construction will be done during the drier summer months.

Based on historic documents, archeological surveys, and informant testimonies, which can be found in the cultural impact assessment (Appendix A), the trail is anticipated to have no negative impacts upon native Hawaiian cultural resources, beliefs, and practices.

Alternatives Considered

Alternative 1—Pali Trail with Restoration and Loop Trail: The alternative of building a Loop trail in addition to the 0.5 mile Pali Trail with native plant restoration efforts taking place along the Pali Trail was considered (Figure 3). This alternative did not compare favorably because although it would provide more trail for greater exercise and recreational opportunities, some members of the community felt that it represented too big a footprint for the area and that its recreational aspects were not appropriate nor desired. Should there be resounding support for this alternative during future community engagements, this alternative may be reconsidered.

Alternative 2—Locate Trail Elsewhere: An alternative to the Pali and Loop Trails is a trail that begins at the Kalaupapa overlook parking lot and runs southwest along an unused road to the pali. Despite the breathtaking views along this section of the pali, in order to reach it, the trail would have to cross over into lands owned by Molokai Ranch. Given the community's and planning team's desires to keep the trail entirely within the park, construction of this trail was not considered a viable option at this time. However, at some point this trail could be constructed as an extension of the preexisting trails, providing users with more trails in the park and also access to the southwest portion of the park.

Alternative 3—No Trail: The alternative of not restoring building a trail was considered. This alternative was rejected considering the loss of educational opportunities and environmental benefits afforded by the project in an accessible part of Molokai.

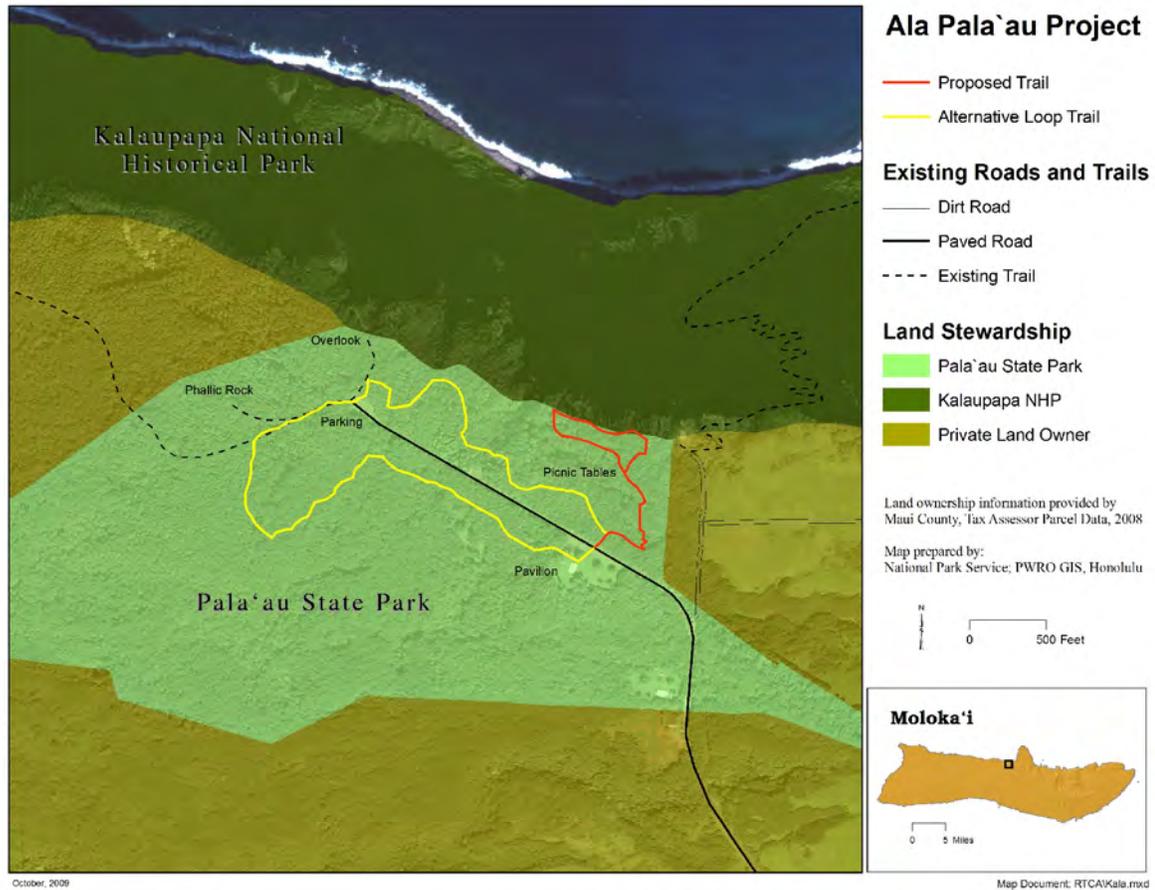
PROPOSED MITIGATION MEASURES

A possible major negative impact to the area will be the result of regular public use over time. However, effective management that includes a maintenance schedule of the trail and plantings will reduce these impacts. Volunteer stewardship, regular maintenance, and appropriate signage will be used to ensure proper management of the project.

While no strategies are considered completely effective for reducing impacts to the area during trail construction, every effort will be made to ensure that impacts to the environment are reduced. Efforts include removing only non-native species, designing and constructing a trail grade that reduces erosion, and constructing appropriate trail slope and drainage structures that minimize erosion. In order to mitigate the spread of invasive species, bootbrushes and interpretive material will be available at the trail heads and along the trail, educating users of this impact. Additionally, volunteer stewards will be informed of the threats posed by nonnative species in order to educate other trail users.

All State historic preservation laws will be followed during the construction and management of the trail in accordance with Hawai'i Revised Statutes. No historic or cultural sites were found within the

Figure 3. Location of alternative Loop Trail in relation to the proposed Pali Trail.



trail corridor; however, should any areas be found, construction will halt immediately and the appropriate offices and authorities will be notified.

ANTICIPATED DETERMINATION

A Finding of No Significant Impact is anticipated for this project as no significant negative impacts to the environment are expected to result from the construction and public use of the trail. In contrast, by establishing native Hawaiian plants and interpretive signs for these resources, public appreciation and understanding of Hawai'i's fragile native ecosystems may be improved.

FINDINGS AND REASONS SUPPORTING DETERMINATION

The anticipated Finding of No Significant Impact is based on the evaluation of the project in relation to the following criteria identified in the Hawai'i Administrative Rules § 11-200-12.

1. Involves an irrevocable commitment to loss or destruction of any natural or cultural resource.

A biological survey and cultural impact assessment (Appendix A) were performed in order to identify threatened or endangered species, historical sites, and cultural practices in the area. The biological survey found no threatened or endangered species occurring along the access trail course or within the entire park. A few native plant species were encountered during the botanical survey (see **Flora**) and every effort will be made that during trail construction only non-native plant species will be removed. The cultural impact assessment identified that the park is accessed for traditional and customary gathering of native plants for cultural, spiritual and healing purposes (Appendix A), and the proposed project will enhance native plant communities in the park. Additionally, the assessment determined that the project area is not accessed for traditional and customary subsistence hunting, and based on past and present archeological studies and oral history sources, the project area itself is not known to have any specific traditional cultural sites.

2. Curtails the range of beneficial uses of the environment.

The Ala Pālā'au Project will expand the range of beneficial uses within the environment by increasing educational opportunities and reintroducing native plant communities in Pālā'au State Park. Appropriate public access to and use of the area is expected to increase following the development of the project.

3. Conflicts with the State's long-term environmental policies established in Chapter 344, HRS, and the National Environmental Policy Act (NEPA).

The proposed project is consistent with the environmental policies laid out in Chapter 344, HRS and the NEPA.

4. Substantially affects the economic or social welfare of the community or state.

The proposed project is not expected to significantly affect the economic or social welfare of Molokai or the State of Hawai'i.

5. Substantially affects public health

The proposed project is not expected to substantially affect public health. In contrast, the project will offer residents with an outdoor education experience that will require walking over one mile, which may improve public health.

6. Involves substantial secondary impacts, such as population changes or effects on public facilities.

No substantial secondary impacts such as population change or effects on public facilities are anticipated to occur based on the construction and use of the proposed project. While public facilities within the park will likely experience more traffic than what currently exists, particularly the park's pavilion, following the construction of the trail, this increase is not expected to be substantial. Most of the negative impacts to these facilities are the result of vandalism. Regular maintenance by the volunteer group and an increased presence of people vested in the project and area may help alleviate these effects.

7. Involves a substantial degradation of environmental quality.

The proposed project area is on undeveloped State Park lands and the overall design of the project will complement the general use of the area. The plantings, access trail, and associated improvements (overlook guardrails and interpretive signs) will have a small footprint and are not expected to result in the substantial degradation of environmental quality.

8. Is individually limited, but cumulatively has considerable effect upon the environment or involves a commitment for larger actions.

Construction and use of the proposed project and access trail are not expected to have a cumulative effect on the environment nor do they involve a commitment for larger actions.

9. Substantially affects a rare, threatened or endangered species or its habitat.

The biological survey did not find any rare, threatened or endangered species or habitats for these species within the trail corridor or within the entire State Park. The project aims to improve the condition of Hawai'i's native flora by outplanting appropriate native species.

10. Detrimentially affects air or water quality or ambient noise levels.

The project will not detrimentally affect air or water quality as the proposed access trail is intended as a footpath only with no addition of public utilities or facilities intended. Given the location of the planting sites and access trail, there is not expected to be any impact to the near-shore ecosystems resulting from run-off due to trail construction or maintenance. Some noise will be generated during vegetation removal and trail construction; however, this activity will take place during the daylight hours only, far from any residential area.

11. Affects or is likely to suffer damage by being located in an environmentally sensitive area such as a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water or coastal waters.

Development of the project is compatible with the above criteria since the project area is not in a flood plain, tsunami zone, beach, erosion-prone area, geologically hazardous land, estuary, fresh water or coastal waters. Furthermore, the proposed trail is not likely to affect any sensitive habitats or areas because the project area was used for cattle grazing for approximately 50 years prior to being planted with non-native hardwood species by the State of Hawai'i in the late 1930's. What remains is largely a **Eucalyptus**, **Melaleuca**, and **Casuarina** forest that is almost completely devoid of any native elements.

12. Substantially affects scenic vistas or view planes identified in county or state plans or studies.

Given the dense forest in the area, the majority of the proposed planting sites and access trail will not be visible from the roadway. Additionally, no views will be obstructed by the plantings and access trail. In contrast, development of the project will provide users with new scenic vistas of the North Shore of Molokai and the Kalaupapa peninsula.

13. Requires substantial energy consumption.

Development of the proposed project is not anticipated to require substantial energy use. Trail construction will utilize volunteer labor from the community, AmeriCorps and the Hawai'i Youth Conservation Corps as much as possible. A majority of the energy that will be required to complete the project will be for tree felling to make room for native plant restoration work. However, this impact will be short both in distance and time.

PERMITS/APPROVALS REQUIRED

Compliance with Chapter 343, HRS, is required in order to implement the proposed trail. No other permits are necessary.

ENVIRONMENTAL ASSESSMENT PREPARATION INFORMATION

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Cultural Impact Assessment
for
Construction and Public Use
of the
Ala Pālā'au Project
Pālā'au State Park, Moloka'i

Prepared For

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November 2009

Mahalo Nui Loa

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For guidance and support . . .

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Summary Cultural Assessment

This Cultural Impact Assessment Report has been prepared as part of the Environmental Assessment (EA) for the proposed Construction and Public Use of the Ala Pala'u Project, Pala'au State Park, Moloka'i. The purpose of this assessment is to consider the effects that the proposed project may have on "all rights customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua'a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights" which are reaffirmed and protected by Article XII, Section 7 of the Hawai'i State Constitution.

Summary Of Findings

1. The primary cultural sites in the Pālā'au State Park area are part of the Nānāhoa Complex. These include the male phallic stone (SIHP #50-30-06-0001); more than 24 petroglyphs (SIHP# - 002); a holua slide (SIHP#-003); and a female phallic stone (SIHP # - 004). This complex is located in the northwestern part of the park past the parking lot. The project area is located in the northeastern part of the park near the entrance and is a considerable distance away from the complex. The construction and public use of the proposed project area should not have an impact on the Nānāhoa Complex.
2. According to past and present archaeological studies and oral history sources, the project area itself is not known to have specific traditional cultural sites.
3. Pālā'au State Park is accessed for traditional and customary subsistence hunting in areas south of the main road and west of the Nānāhoa Complex. The project area, north of the main road and east of the Nānāhoa Complex, is NOT accessed for traditional and customary subsistence hunting.
4. Pālā'au State Park is accessed for traditional and customary gathering of native plants for cultural, spiritual and healing purposes. The proposed project will enhance the native plant communities in the park.
5. The Department of Hawaiian Homelands (DHHL) owns the 233.680 acres of land which comprise the Pālā'au State Park. The lands are leased to the Department of Land and Natural Resources under Lease No. 336 from December 28, 1991 through December 27, 2011, for \$989.00 per annum.

The October 2007 Regional Plan of the DHHL for the island of Moloka'i includes the development of a Cultural and Educational Community Center in Pālā'au at the Pālā'au State Park site. It states:

This center would perpetuate the traditional cultural practices of Hawai'i, but would be specific to the historical legacy of Moloka'i and Kalaupapa. DHHL

envisions the community center to be a full-service center where charter schools or immersion schools could utilize the center in the daytime, other hālau and community could share it in the evenings and weekends. Further this center could integrate efforts of NPS to create a visitors' center that would provide educational programs and experiences without the necessity for visitors to physically visit and disturb the peninsula.

Given, this plan, it is important for this project to receive input and support from the Moloka'i homestead community and DHHL, so that it will complement and enhance the future uses projected in the DHHL Regional Plan.

6. Pālā'au State Park is utilized by neighboring families; Native Hawaiian cultural practitioners; school groups; Hawaiian Homesteaders.

7. Community groups may have use for the invasive trees that will be removed for the native planting project for construction of hālau.

8. Native plants identified as growing in Pālā'au and Kahanui historically include small Lehua, pilo, Ohia ha, paumakani, Ohelo, Akia, Kopiko, Alahee, Pua Keawe and Naupaka. The 'iwa fern is connected with Nā'iwa

Summary of Recommendations

1. Focus the project on the removal of invasive trees and native plant restoration with connecting paths to facilitate the plantings and their propagation and growth in the northeast sector of the park.

2. Develop the project with input and support from the Moloka'i homestead community and DHHL.

3. Form a cultural working group to develop the planting project comprised of members of the Moloka'i homestead community; neighboring residents and landowners, i.e. the Meyer 'Ohana and the National Park Service; park users; Native Hawaiian cultural practitioners; and educators.

4. If feasible, invite community groups to haul away the invasive trees that will be removed for the native planting project.

5. If burials are inadvertently uncovered in the course of implementing the project, the appropriate cultural and legal protocols established by Hawaiian custom and practice and applicable state and federal laws should be followed. As Hawaiian Home Lands, the process established under the Native American Graves Protection and Repatriation Act (NAGPRA) needs to be followed if any human remains are inadvertently discovered during the project. Work should immediately stop and the DHHL notified. DHHL will act in accordance with NAGPRA. Remains will not be removed without approval. All

decisions regarding the disposition and treatment of Native Hawaiian human remains will be made by DHHL in accordance with NAGPRA. As a courtesy a Division of State Parks archaeologist may be contacted as well as the State Historic Preservation Division.

6. If cultural sites are inadvertently discovered in the course of implementing the project, appropriate cultural protocol should be followed and the discoveries shall be documented. Any artifacts shall be catalogued and turned over the DHHL.

7. Among the plants to include in the project should be native plants identified as growing in Pālā'au and Kahanui historically such as small Lehua, pilo, Ohia ha, paumakani, Ohelo, Akia, Kopiko, Alahee, Puu Keawe and Naupaka. There is also the 'iwa fern for which Nā'iwa is named.

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Section 1 Introduction

1.1. Project Description

Ke Aupuni Lōkahi Moloka'i Enterprise Community (KAL) is the sponsor of the proposed Construction and Public Use of the Ala Pala'u Project, Pala'au State Park, Moloka'i. The mission of Ke Aupuni Lōkahi has guided the conception and direction of the proposed project. Its mission statement is as follows:

"Moloka'i is the last Hawaiian island. We who live here choose not to be strangers in our own land. The values of *aloha 'aina* and *malama 'aina* (love the land and care for the land) guide our stewardship of Moloka'i's natural resources, which nourish our families both physically and spiritually. We live by our *kupuna* (elders') historic legacy of *pule o'o* (powerful prayer). We honor our island's Hawaiian cultural heritage, no matter what our ethnicity, and that culture is practiced in our everyday lives. Our true wealth is measured by the extent of our generosity.

- We envision strong *'ohana* (families) who steadfastly preserve, protect and perpetuate these core Hawaiian values.
- We envision a wise and caring community that takes pride in its resourcefulness, self-sufficiency and resiliency, and is firmly in charge of Moloka'i's resources and destiny.
- We envision a Moloka'i that leaves for its children a visible legacy: an island *momona* (abundant) with natural and cultural resources, people who *kokua* (help) and look after one another, and a community that strives to build an even better future on the *pa'a* (firm) foundation left to us by those whose *iwi* (bones) guard our land."

In November 2008, KAL received a Natural Resources grant from the Hawai'i Tourism Authority to complete a comprehensive plan to improve the natural and cultural resources in Pālā'au State Park, Molokai. Named Ala Pālā'au, the objectives of the proposal were to restore native forest habitat and rare species in the area, improve views of Kalaupapa peninsula and the cliffs of the northern coast of Molokai, and provide interpretation and education of these unique natural and cultural resources.

The initial concept of the project was aimed to benefit the Molokai community by improving the park while providing education, conservation, and employment opportunities. The vision of the project is to provide a place-based learning experience where local schools, community members, and interested visitors can come to learn about Molokai's rich biological and cultural heritage. This project will provide a hands-on educational experience that encourages pride in Pālā'au State Park's resources and highlights the importance of preserving Molokai's native species and ecosystems while teaching about the role they play in Hawaiian culture.

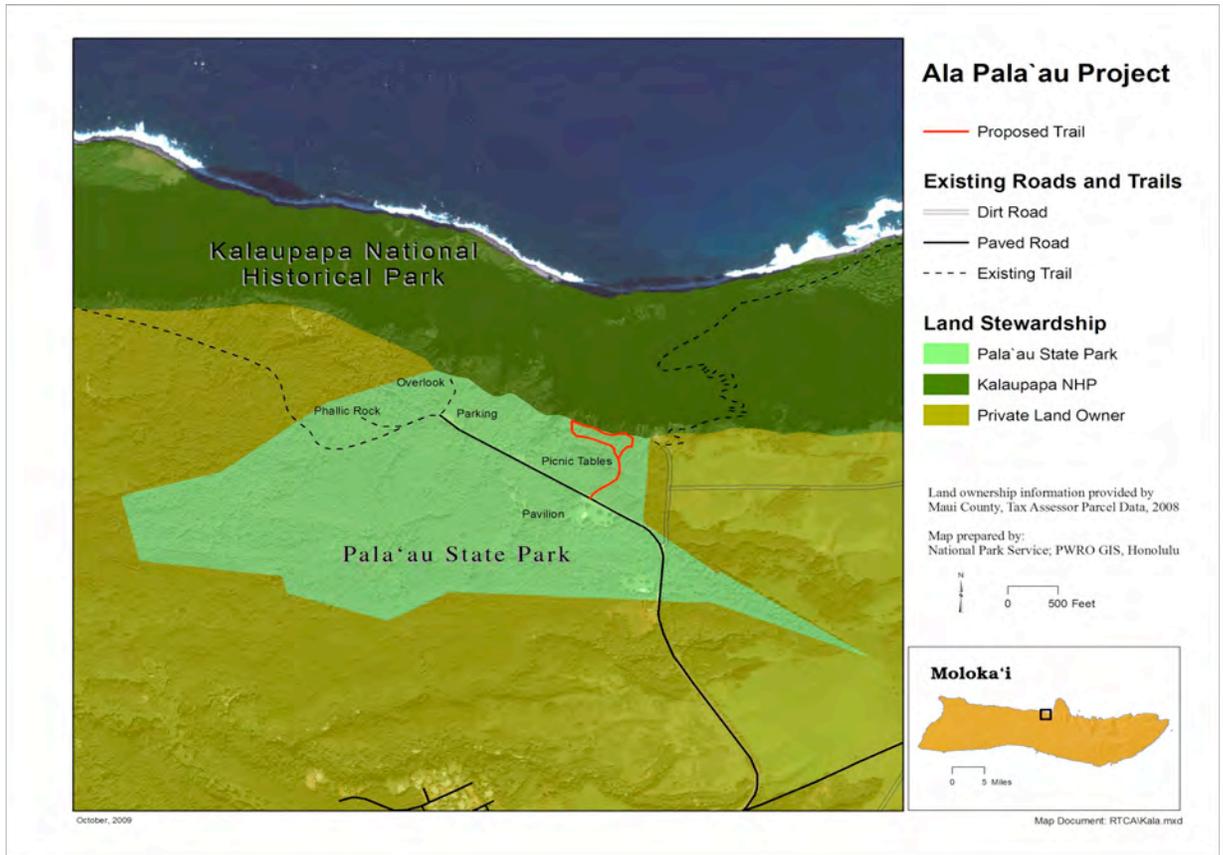


Figure 1. Map showing Pālā'au State Park, Island of Moloka'i and the selected project area in red going northeast from the highway and out toward the pali or cliffs in a loop.

The project involves invasive alien tree removal and native plant restoration. A trail approximately 0.5 miles long will be developed to provide access to the native plant restoration sites for planting, watering, weeding and overall maintenance.

The trail will begin on the north side of Kala'e Highway, across from the Pālā'au State Park pavilion and run northward down and up a small drainage. It will then go along the northeastern rim of the drainage until it reaches the edge of the pali (cliffs). Along the pali will be a short loop to incorporate two small overlooks before linking back to the entry trail back across the drainage to the highway.

The trail will be a footpath for novice to medium-level experienced hikers, 2 to 3 feet wide and intended for pedestrian use only. All wheeled vehicles, horseback riding and other non-pedestrian uses will be prohibited.

Figure 2 shows, in yellow, a longer alternate trail route which loops around the main road that was also considered. The archaeological assessment included a survey of this alternate route. While there were some community members who supported this alternate route, several cultural practitioners were mildly to adamantly opposed to it because of proximity to subsistence hunting trails and potential impacts to the Nānāhoa Complex. For this reason the project area selected is the 0.5 mile route which loops out toward the pali. This cultural assessment focuses on this specific project area.

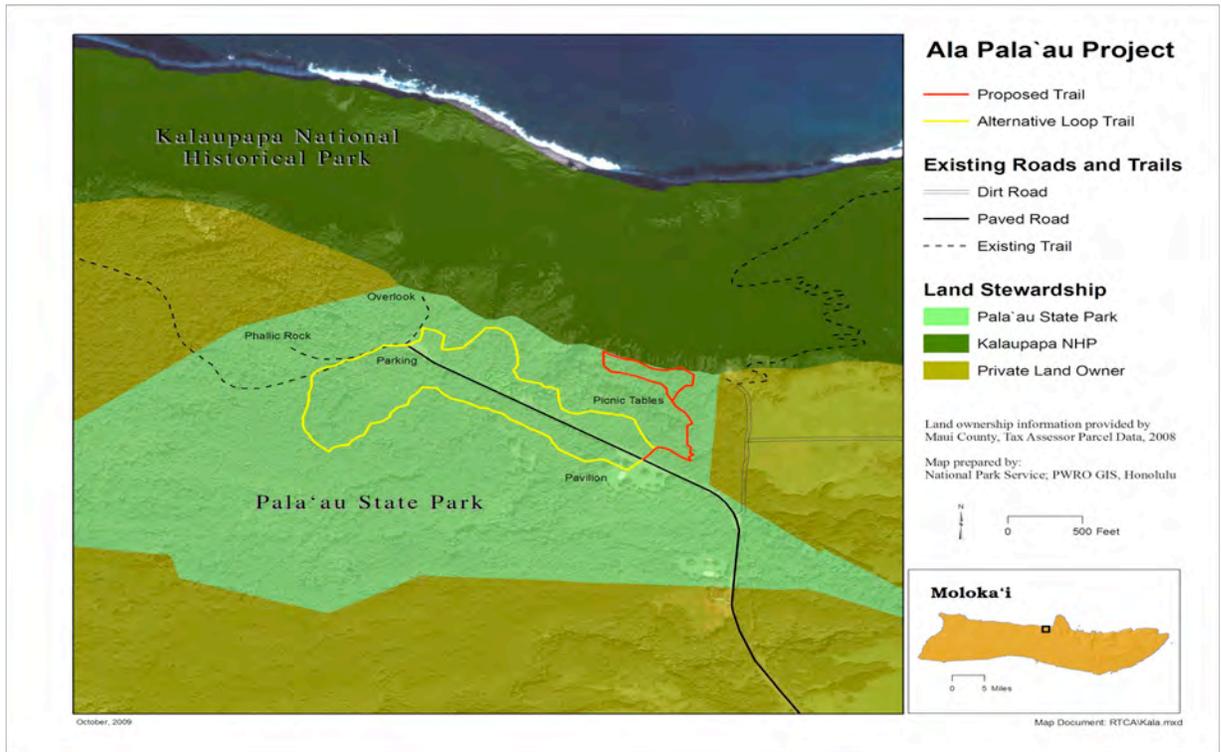


Figure 2. Map showing alternate route which was considered in yellow, in relation to the final selected route, in red.

1.2 Scope of Work

The following Scope of Work is designed to gather the information needed to comply with the Act 50, follow the guidelines of the Office of Environmental and Quality Control (OEQC) and fulfill the specific guidelines of the Hawai'i State Supreme Court regarding findings which must be made in order to "preserve and protect customary and traditional native Hawaiian rights to the extent feasible" in its ruling, Ka Pa'akai O Ka 'Aina v. Land Use Commission, State of Hawai'i / 94 Haw. 31 (2000).

- (1) Examine historic documents, Land Commission Awards and historic maps with the specific purpose of identifying traditional Hawaiian activities. Such activities would include the gathering of plant, animal and other resources, in addition to agricultural pursuits, as may be indicated by the historic record.
- (2) Review existing archaeological information pertaining to cultural sites and their use, as this may enable us to reconstruct traditional land use activities, as well as identify and describe past and/or present cultural resources, practices and beliefs associated with the area where the trail will be constructed.
- (3) Conduct limited key informant interviews with persons knowledgeable about the historic and traditional practices in the project area(s).
- (4) Preparation of a report on the above items summarizing gathered information as related to traditional practices and land use. The report will assess the impact of the proposed action on the cultural practices and any identified features.

1.3. Setting

The proposed project area is located within the Pālā'au State Park, which is located along coastal cliffs on the north coast of central Moloka'i, southwest of the Kalaupapa Peninsula. Pālā'au State Park, which is Tax Map Key parcel 5-2-12:06, encompasses 233.68 acres and comprises the entire Apana of Pālā'au 3, which is a lele or discontinuous parcel of the district of Pālā'au, which includes Apana 1, 2, and 3. It is accessed through Kala'e Highway which enters and ends at a parking lot inside of the park.

Kilohana, the highest point in the park has an elevation of 1,665 feet above sea level, while Pu'u Lua, the second highest point is 1,644 feet above sea level. (Survey Map, Territory of Hawaii, 9-10-52). Temperature ranges between 65 and 80 degrees Fahrenheit and the annual average rainfall is 40 to 60 inches (Juvik and Juvik: 1998).

The primary attraction in the park is the Kalaupapa Lookout. The principal cultural sites in the Pālā'au State Park area comprise the Nānāhoa Complex. These include the male

phallic stone (SIHP #50-30-06-0001); more than 24 petroglyphs (SIHP# - 002); a holua slide (SIHP#-003); and a female phallic stone (SIHP # - 004).

The area proposed for construction and public use of a trail and native plant restoration is located near the entry to the park, on the north side of the road, in the area between the road and the pali or cliffs.

The entrance to the park is located just past the mule ride concession

The onsite caretaker's residence is located on the south side of the main entrance to the park. The residence was constructed in 1976 and consists of 3 bedrooms, one bath and an adjoining garage.

Past the caretaker's residence, on the north side of the road is the Kalaupapa trail head. The trail starts on private land owned by the Meyer family. Within the park, employees and visitors of Kalaupapa National Park who hike down the trail to Kalaupapa are allowed to park their vehicles.

Approximately one-quarter mile north of the caretaker's residence, also on the south side of the road is a pavilion and restroom. It is an A-framed wooden structure which sits on a concrete foundation and is surrounded by a large open lawn planted with koa trees.

A picnic and camping area with a restroom is located 600 feet north of the pavilion, also on the south side of the main road. It is accessed by a dirt road. Trails from the restroom lead to concrete picnic tables.

Another picnic area is located 200 feet north on the north side of the main road and has paved parking and running water.

The Kalaupapa Lookout is located at the northern end of the main road. Access to the lookout is via a footpath from the paved parking lot. In September 1985 the National Park Service improved the lookout with a concrete walkway and stone wall. In 1986 a series of informational exhibit panels were installed to provide a history of the Kalaupapa Peninsula and Hansen's disease.

A footpath also leads from the parking lot out to the Nānāhoa site complex.

A public restroom is also located at the end of the parking lot where the lookout and Nānāhoa footpaths begin.

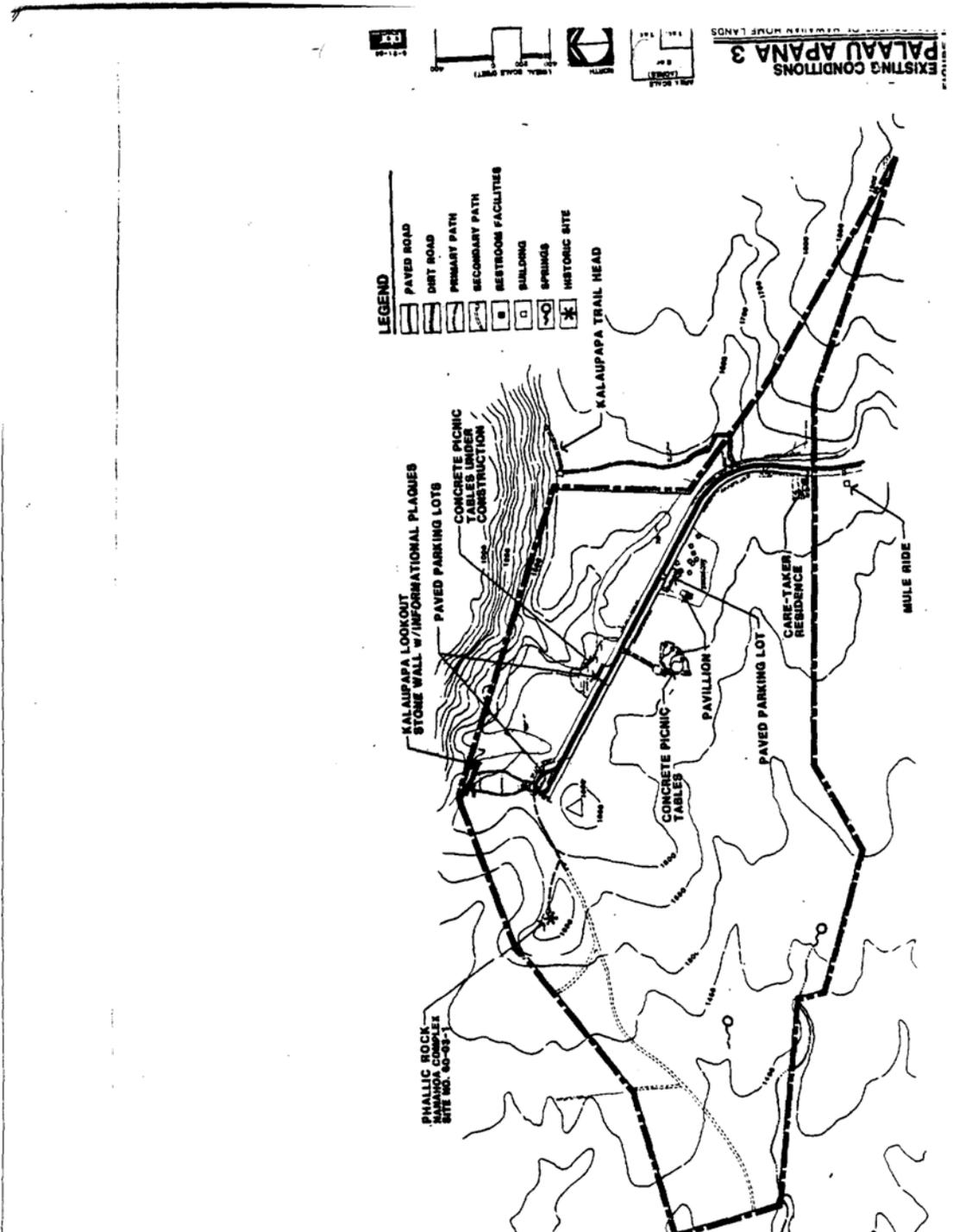


Figure 3. Map of Pālā'au State Park from 1986 DLNR report

Section 2 Methodology

2.1 Framework For this Cultural Assessment

This Cultural Assessment Report has been prepared as part of the Environmental Assessment (EA) for the proposed Construction and Public Use of the Ala Pala'u Project, Pala'au State Park, Moloka'i. The purpose of this assessment is to consider the effects that the proposed project may have on "all rights customarily and traditionally exercised for subsistence, cultural and religious purposes and possessed by ahupua'a tenants who are descendants of native Hawaiians who inhabited the Hawaiian Islands prior to 1778, subject to the right of the State to regulate such rights" which are reaffirmed and protected by Article XII, Section 7 of the Hawai'i State Constitution.

This report is designed to fulfill the specific guidelines of the Hawai'i State Supreme Court regarding findings which must be made in order to "preserve and protect customary and traditional native Hawaiian rights to the extent feasible" in its ruling, Ka Pa'akai O Ka 'Aina v. Land use Commission, State of Hawai'i / 94 Haw. 31 (2000).

According to the ruling, specific findings and conclusions should include:

- (1) the identity and scope of 'valued cultural, historical, or natural resources' n27 in the petition area, including the extent to which traditional and customary native Hawaiian rights are exercised in the petition area;
- (2) the extent to which those resources, including traditional and customary native Hawaiian rights will be affected or impaired by the proposed action; and
- (3) the feasible action, if any, to be taken by the LUC to reasonably protect native Hawaiian rights if they are found to exist. n28

In addition, by following these guidelines, this report also conforms to Act 50 (SLH 2000) which provides that environmental impact statements:

- (1) Include the disclosure of the effects of a proposed action on the cultural practices of the community and State; and
- (2) Provides that the definition of "significant effect" include adverse effects on cultural practices.

In fulfilling the above guidelines, the assumptions underlying the approach to this cultural assessment include the following:

- Natural resources are also cultural resources.
- Custom and practice is usually examined in relation to a particular island, district or ahupua'a. An ahupua'a runs from the sea to the mountains and contains a sea fishery and sea beach, a stretch of kula or open cultivable land and higher up, its forest. The court of the Hawaiian Kingdom described the ahupua'a principle of

land use in the case of In Re Boundaries of Pulehunui, 4 Haw. 239, 241 (1879) as follows:

A principle very largely obtaining in these divisions of territory [ahupua'a] was that a land should run from the sea to the mountains, thus affording to the chief and his people a fishery residence at the warm seaside, together with the products of the high lands, such as fuel, canoe timber, mountain birds, and the right of way to the same, and all the varied products of the intermediate land as might be suitable to the soil and climate of the different altitudes from sea soil to mountainside or top.

- Traditional and customary rights of ahupua'a tenants are rooted in the customs, practices and rights of the original and still primary social unit of the Hawaiian people, the 'Ohana. Custom and practice encompasses the full range of traditional, cultural, religious, and subsistence activities Native Hawaiian 'ohana have engaged in for many centuries to live as a people and survive in a unique island environment.
- On Moloka'i, subsistence is the customary and traditional uses of wild and cultivated renewable resources for direct personal or family consumption as food, shelter, fuel, clothing, tools, transportation, culture, religion, and medicine; for barter or sharing, for personal or family consumption and for customary trade. (Governor's Task Force On Moloka'i Fishpond Restoration)

2.2 Cultural Resources

The following identifies the resources which are essential for the conduct of Hawaiian subsistence customs, beliefs and practices. This cultural assessment sought to determine if any of these resources are present in the proposed project area:

1. Areas of naturally occurring or cultivated sources for food, medicine, and shelter.
 - a. Fresh water streams, springs, ponds, wetlands, irrigation networks, including 'auwai for taro cultivation; gathering of fresh water aquatic resources; for drinking, for healing and for domestic uses.
 - b. Shorelines, reefs, nearshore and offshore ocean for marine foods, medicine, salt and conducting cultural and spiritual customs and practices.
 - c. Forests for hunting pigs, deer, goats, birds, etc.; for gathering of flora used for food, household goods, arts, crafts, construction materials, cultivation, firewood, decoration, adornment, ritual offerings, and the conduct of spiritual customs.

2. Habitats of naturally occurring or cultivated endangered terrestrial and marine native flora and fauna, including plant and animal materials used for medicinal purposes.
3. Trails and dirt roads are indispensable to afford access to the cultural resources and use areas, both mauka to streams, springs, and forests and makai to streams, wetlands, and the ocean.

The following identifies the resources which are essential for the expression and perpetuation of Hawaiian culture, religion and language. This cultural assessment sought to determine if any of these resources are present in the proposed project area:

1. Wahi Pana: These are sacred sites such as heiau, shrines, burial caves and graves and geographic features associated with deities and significant natural, cultural, spiritual or historical phenomenon or events. Edward Kanahale offered the following description of wahi pana in the introduction to Ancient Sites of O'ahu by Van James (1991):

The gods and their disciples specified places that were sacred. The inventory of sacred places in Hawai'i includes the dwelling places of the gods, the dwelling places of venerable disciples, temples, and shrines, as well as selected observation points, cliffs, mounds, mountains, weather phenomena, forests, and volcanoes.

2. Natural and cultural areas believed to be traditional domains of ancestral spirits and Hawaiian and deities where Hawaiians renew their ties to ancestors through experiencing natural phenomena and witnessing ho'ailona (signs) are also wahi pana.
3. Known historical and contemporary religious beliefs, customs, and practices related to an area.
4. Habitats of naturally occurring or cultivated endangered terrestrial and marine native flora and fauna used for cultural and religious ceremonies, rituals, arts, crafts, and related activities.
5. Natural, cultural and community resources for perpetuation of language, especially place names.
6. Natural and community resources for cultural forms of art, craft, music, and dance.

2.3 Methodology

2.3.1 Limited Key Informant Interviews

Key informant interviews were conducted with the following residents of Moloka'i regarding their knowledge of natural and cultural resources in the Pala'au State Park, cultural, religious or subsistence activities in the Park and potential positive and negative impacts of the proposed project.

Myron Akutagawa - born and raised on Moloka'i; a subsistence hunter and fisherman; he and his wife, Colette Machado, have a homestead in Ho'olehua.

Iwalani Arakaki - kupuna; Kalama'ula homesteader.

Noa Emmett Aluli - a physician in family practice on Moloka'i since 1975; a resident of the Ho'olehua Homestead; a cultural practitioner.

Dorothy Curtis - a 20-year resident of Moloka'i; an ethnographer who has researched land tenure on Moloka'i, the trails of Kalaupapa.

Adolph Helm - born and raised on Moloka'i; a subsistence hunter and fisherman; a former employee at Kalaupapa; a Ho'olehua Homesteader.

Vanda Hanakahi - born and raised on Moloka'i; a kupuna and cultural practitioner; a Ho'olehua homesteader.

Pearl Hodgins - born and raised on Moloka'i; a member of the Meyer 'Ohana which owns the lands adjacent to Pala'au State Park.

Noelani Keliikipi - born and raised on Moloka'i; a member of the Meyer 'Ohana which owns the lands adjacent to Pala'au State Park; curator of the Moloka'i Cultural Museum.

Kauila Reyes - born and raised on Moloka'i; kumu hula; kupuna; Kalama'ula homesteader

2.3.2 Meetings With Cultural Practitioners

Informational meetings were held in August with Ho'olehua and Kalama'ula Homesteaders. The homesteaders were generally receptive to the proposed project. Some of the homesteaders went on a site visit and hiked through the project area and expressed their support for the project.

A special meeting was held on August 13, 2009 by project staff with cultural practitioner and subsistence hunter, Walter Ritte and cultural practitioners Loretta Ritte and Scarlet Ritte. Their concerns about the project were discussed. As a result of this meeting, the project was streamlined from a larger trail project to the native plant restoration and footpath project.

To incorporate the input of Native Hawaiian cultural practitioners into the project a cultural working group was initiated. Cultural practitioners Kawika Duvauchelle and Mikiala Pescaia attended the first meeting and their input has been incorporated into this cultural assessment.

2.3.3 Historical Documents and Land Commission Awards

A search of documents and published sources about the cultural and natural resources of Pālā'au 3 was conducted. A major repository of historical documents about the Pālā'au State Park and its history were the Division of State Parks and the Division of Forestry and Wildlife of the Hawai'i State Department of Land and Natural Resources. Major sources are listed in the bibliography and significant documents are attached in the appendices.

Pālā'au (1, 2 and 3) is listed as Crown Land in the Indices of Land Awards, therefore, there is no land commission testimony for Pālā'au.

The boundaries of Pālā'au 3 were certified by Samuel Chillingworth, the Commissioner of Boundaries for the Islands of Maui, Molokai and Lanai on February 28, 1889. The boundaries were agreed to by Mr. R. W. Meyer for Charles R. Bishop and Princess Pauahi Bishop and for himself and Mr. M. Monsarrat for the Hawaiian Government, according to the Boundary Commission record book. There were no testimonies presented to the Boundary Commission.

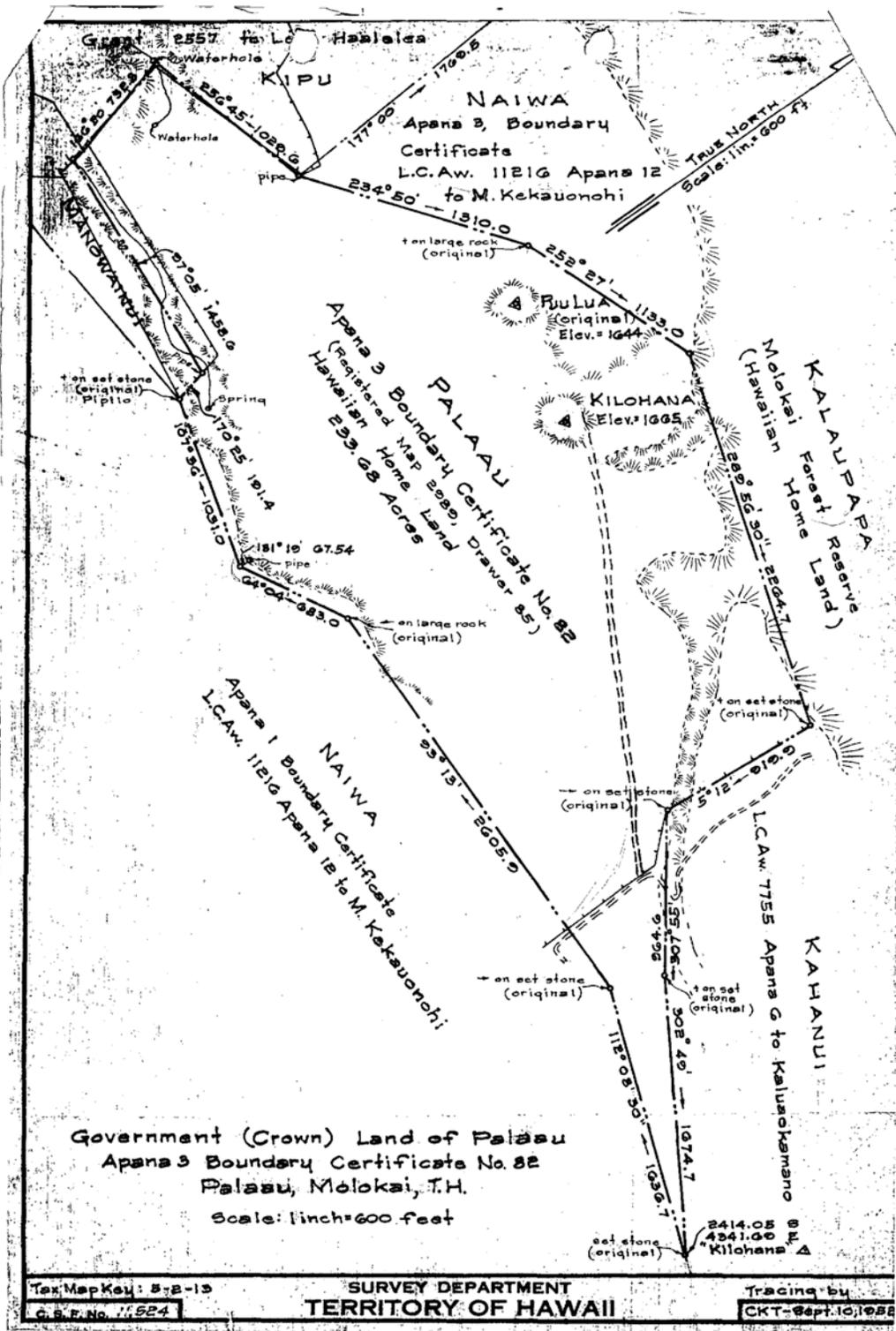


Figure 4. Map from Boundary Certificate No. 82.

Section 3 Historic Cultural Landscape of Pālā'au State Park

3.1 Ahupua'a and Boundaries

The proposed project site is located in Pālā'au 3 which is a lele or noncontiguous section of the Ahupua'a of Pālā'au which includes Pālā'au 1, 2 and 3. Pālā'au 3 is surrounded by the ahupua'a of Kalaupapa, Kahanui, Nā'iwa, Manowainui and Kīpū. The boundaries of Pālā'au 3 are described in Boundary Certificate 82 issued by the Commissioner of Boundaries, Islands of Maui, Molokai and Lanai, on February 28, 1889. This certificate is attached as Appendices 1, 2 & 3.

According to Catherine Summers, Pala'au 1, 2 and 3 comprise an ahupua'a. However, Daniel Terry and Christopher Monahan state that John Kaimikaua considered Pālā'au to be a moku. (Terry & Monahan, 2005)

According to Catherine Summers in Moloka'i A Site Survey, Moloka'i was traditionally divided into two moku or districts, "Ko'olau on the northeastern side and Kona on the western half and southeastern portion." (Summers, 1971, 26) Summers said that the Ko'olau moku consisted of the ahupua'a of Hālawa, Wailau, Pelekunu, Waikolu, Kalawao, Makanalua and Kalaupapa and that the rest of the island was in the Kona district. Summers states that in 1859, after Ka Māhele, the island was made into one district called Moloka'i and that in 1909 the island was divided into two districts, Molokai and Kalawao.

Terry and Monahan, citing personal communication with the late Moloka'i kumu hula, John Kaimikaua, state that traditionally the island was divided into four moku - Kaluako'i, Pālā'au, Ko'olau and Kawela. (Terry & Monahan, 2005) Under this configuration, Pala'au 3 would be one of the ahupua'a within the moku of Pālā'au. According to Mikiala Pescaia, in addition to Pālā'au 1, 2, and 3, Naiwa was also an ahupua'a of Pālā'au. (Meeting 8-8-09)

Pālā'au 1, 2, and 3 were claimed by Kealiiahonui at the 1848 Mahele and returned to the King who retained it as Crown lands, according to Hawaiian Place Names. (Soehren, 2002-2004) Chief Kealiiahonui was a great grandson of High Chief Kekaulike of Maui. (Indices, 1929,10)

The isolation of Pālā'au 3 from the other sections of the Pālā'au ahupua'a is intriguing. Perhaps Pālā'au 3 was configured so as to specifically include the Nānāhoa complex within the north section of the Pālā'au ahupua'a. Pālā'au 1 was configured to include the Poho'ele Fishpond along the south shore of Moloka'i. Pālā'au 2 is largely agricultural land in central Moloka'i.

Two adjoining ahupua'a, Nā'iwa and Kahanui are also divided into three noncontiguous apana. These ahupua'a, like Pālā'au include an apana in south Moloka'i, an apana in central Moloka'i and an apana in north Moloka'i. This suggests, that this was a pattern of land settlement and use that evolved in central Moloka'i.

3.2 Named Special Places or Wahi Pana of Pālā'au 3 Ahupua'a

This section lists the wahi pana or named special places associated with Pālā'au and their meaning and significance. These places appear on maps of Pālā'au 3 and are named in the description of the boundaries of Pālā'au 3 in Boundary Certificate 82, February 28, 1889. (See Appendices 1, 2 & 3)

Kahanui - large place (Pukui, Elbert, 1974)

At the Mahele, Kaluaokamano retained 1/2, LCAw 7755, and returned a/2 to the Government. Like Pālā'au, Kahanui has three noncontiguous parts: Apana 1 at the south shore contains four fishponds; Apana 2, the largest, was sold as RPG 2709; Apana 3 high in the mountains, was sold as RPG 3437 and 3539. (Soehrens, 2002-2004)

Kalaupapa - The flat plain

Village, peninsula, and land division, Moloka'i; present site of the leper settlement on Kalaupapa peninsula. The source of the lava that formed the peninsula was a small shield volcano against the cliff, rising to an altitude of 405 feet. Its top is indented by Kauhakō Crater, a quarter of a mile across and more than 45 deep, containing a pool of brackish water. (Pukui, Elbert, 1974)

Kauleonanahoa - The penis of Nanahoa

Hill and phallic rock. Legendary character and symbol of sexuality. discussed in 3.6 Cultural Resources section

Kawahuna

Site 4. Female phallic stone . . . located on the NW slope of Nanahoa hill (cf. Puu Lua), at an elevation of approximately 1550 ft . . . also called Nawa'akaluli . . . and Waihu'ehu'e . . ." Kawahuna was the wife of Nanahoa. (Soehrens, 2002-2004)

Keōlewa - The shifting sand (Pukui, Elbert, 1974)

A cinder cone in the Upper member of the East Molokai Volcanic Series. Elevation 2109 ft, on the Molokai/Kalawao District boundary overlooking Kalaupapa. The "Pali of Keolewa" is frequently mentioned as bounding kuleana in Kalaupapa on the south. Soehrens, 2002 - 2004)

Kilohana - Lookout point or outer tapa or best, superior.

Point near Kala'e overlooking Kalaupapa. (Pukui, Elbert, 1974)

Kīpū - Hold back. (Pukui, Elbert, 1974)

Returned by Kaua at the Mahele, retained by the Government; sold with Manowainui as RPG 2557. Kipu is placed in the Koolau District by Alexander (1903: 390) and with Manowainui, in Kalae District in Indices 16. (Soehrens, 2002-2004)

Manowainui - Great water source (Pukui, Elbert, 1974)

Returned by Kapu at the Mahele, retained by Government; sold with Kipu as RPG 2557. Termed "Lele O Manowainui" on TM 2-5-00. Manowainui is placed in Kalae District in Indices 16. (Soehrens, 2002-2004)

Nā'iwa - The frigate birds (Pukui, Elbert, 1974)

Retained by Kekauonohi at the Mahele, LCAw 11216:12. Like Pālā'au, Nā'iwa is in 3 noncontiguous parts. Apana 1, the largest, is cut off from the south shore by parts of Ho'olehua, Pālā'au and Kahanui. Apana 2, formerly called Ma'ili contains 53 acres at the end of a ridge between Mimino Gulch and Kapale Gulch. Apana 3 contains 53 acres between Pu'u Lua and the top of the pali. (Soehrens, 2002-2004)

According to Aunty Harriet Ne, Nā'iwa is named for the 'iwa fern. According to a mo'olelo shared by Aunty Harriet Ne with Philip Spalding II on February 8, 1988, the 'iwa fern grew wild only at Kalaupapa until a young man from Kalaupapa gave his sweetheart who lived in the area called Nā'iwa a lei po'o made of the 'iwa fern. She wore the lei until it dried and the wind blew it off of her head. The wind spread the spores of the fern which were watered at nightfall by the "ualilii" and in no time the area was covered with 'iwa fern.

Pālā'au - Wooden fence or enclosure (Pukui, Elbert, 1974)

Returned by Kealiihohonui at the Mahele, retained by the Crown. Palaaui is in three noncontiguous apana. Apana 1 contains Poho'ele fishpond, apana 2 is in the Ho'olehua-Pālā'au Homesteads, Apana 3 contains Kauleonanahoa and other sites. wooden fence or enclosure (Soehrens, 2002-2004)

In a discussion with cultural practitioners on August 28, 2009 they spoke of Pālā'au possibly meaning a place of healing, as with native plants. One of the informants interpreted as a place where medicine is administered

Pipilo - The corner of Manowainui/Naiwa 1; Palaaui 3 is at a "point at edge of gulch at place called Pipilo . . ." Elev. about 1425 feet. (Soehrens, 2002-2004)

Pohakuokane - Hill of Kāne (Pukui, Elbert, 1974)

The east boundary of Palaaui 3 ends "at edge of pali at place called Pohakuokane." (Soehrens, 2002-2004)

Pu'u Lua - One of the highest points in the Pālā'au State Park.

Pu'u Olelo - A cinder cone in the Upper member of the East Molokai Volcanic Series. Elev 2158 ft. (Soehrens, 2002-2004)

Nawa'akaluhi

An alternate name for the female stone, Kawahuna. Waihu'ehu'e is also a name for this stone.

Nawa'akaluli /

- A boundary point on the Nā'iwa - Pālā'au boundary on the northwest slope of Puu Lua, Elev about 1545 ft. An alternate name for Kawahuna. (Soehrens, 2002-2004)

Boundary Certificate 82 calls it Nawaakaluhi

Waialala - Screaming water (Pukui, Elbert, 1974)

Famous watering-place. One of Molokai's most interesting legends is about this spring. Only one person could approach this place at a time. Whenever a chief of another island reached the heights of Kalae after a tedious climb of several miles, and of course thirsting for a drink, he would be ordered by the Kalae chiefs to go up to their source of water or die of thirst. The chiefs of Kalae were never known to take a rank secondary to any other chief from elsewhere, no matter what his caste. (Cooke, 1949, 150)

3.3 Historical Land Use and Management

Pālā'au 1, 2, and 3 were claimed by Kealiiahonui at the Mahele and returned to the King who retained it as Crown lands, according to Hawaiian Place Names. (Soehren, 2002-2004)

The boundaries of Pālā'au 3 were certified by Samuel Chillingworth, the Commissioner of Boundaries for the Islands of Maui, Molokai and Lanai on February 28, 1889. The boundaries were agreed to by Mr. R. W. Meyer for Charles R. Bishop and Princess Pauahi Bishop and for himself and Mr. M. Monsarrat for the Hawaiian Government, according to the Boundary Commission record book. No testimonies are recorded in the Boundary Commission record book.

On January 1, 1888 King Kalākaua issued a 30 year lease on Pālā'au 3. When Moloka'i Ranch was formed in 1897, it purchased a cattle ranch that had originally belonged to Kamehameha V Lot Kapuaiwa. When he passed away, the ranch passed on to his half sister Princess Ruth Kelikolani, who passed it on to her cousin, Princess Bernice Pauahi Bishop. When Princess Bernice Pauahi Bishop passed away she placed her lands into a trust for the education of Native Hawaiians, the Bishop Estate. According to George Cooke, "They had purchased seventy thousand acres of land in fee simple from the Bishop interests for the sum of one hundred fifty thousand dollars. With an additional thirty thousand acres leased from the Government, stock-raising became their principal enterprise." Thus, the lease on Pālā'au 3 was presumably held by the Bishop Estate and transferred to Moloka'i Ranch in 1897. The lease was then held by Moloka'i Ranch until it expired in 1918 (Cooke, 1949)

Pālā'au 3 was classified as forest reserve lands in July 1912 but it continued to be used for grazing by Moloka'i Ranch which held the Kalākaua lease through January 1, 1918. (Cooke, 1949) After the lease expired, Moloka'i Ranch continued to rent Pālā'au 3 from year-to-year and use it for cattle grazing for another five years until 1923.

In 1921, when the Hawaiian Homes Act of 1920 went into effect, title to Pālā'au 3 was transferred to the Hawaiian Homes Commission. However, Pālā'au 3 was not actually turned over to the newly formed Hawaiian Homes Commission until 1923. At that time fences were put up in order to contain the cattle outside of the Hawaiian Homes Commission boundary and within the newly established ranch boundaries. (Cooke, 1949, 76-80)

On July 19, 1928 the Hawaiian Homes Commission passed a motion to dedicate Pālā'au 3 for the purpose of reforestation by the Board of Agriculture and Forestry. Subsequently, Opinion No. 1517 of the Attorney General of Hawaii, dated December 28, 1928 stated that the lands must first be returned to control of the Commissioner of Public Lands before it could be set aside as a forest reserve. The Opinion rationalized the return as follows:

"Forest growth is a well recognized aid to the protection and conservation of water which is one of the prime necessities in the case of persons who will secure leases of Hawaiian home lands xxx the Hawaiian Homes Commission is authorized to use any government owned water for the which is one of the prime necessities in the case of persons who will secure leases of Hawaiian home lands xxx the Hawaiian Homes Commission is authorized to use any government owned water for the purposes of said Act; so that, in setting aside Hawaiian home lands as forest reserves, the government will really be aiding and furthering the purposes of the Hawaiian Homes Commission Act . . . However, it is believed that the Hawaiian Homes Commission would not lightly disregard the benefits of forestation of its waste lands and recall the same to its control except for very strong and cogent reasons, which would not arise for many years to come, if at all, so that as a practical matter such setting aside would se unobjectionable." (Letter of Territorial Forester to Board of Commissioners of Agriculture and Forestry, May 18, 1936, see Appendix 8)

On August 15, 1929, the Hawaiian Homes Commission passed Resolution #9 which officially returned Pālā'au 3 to the Commissioner of Public Lands of the Territory of Hawai'i, to again be managed as part of the Moloka'i Forest Reserve. At the time, the lands were not being leased to native Hawaiians as authorized under the provisions of the Hawaiian Homes Commission Act. (see Resolution #9 in Appendix 3)

On March 25, 1930, by proclamation of the Governor of the Territory of Hawai'i, Pālā'au 3 was added to the Moloka'i Forest Reserve. (Letter of Territorial Forester to Board of Commissioners of Agriculture and Forestry, May 18, 1936, see Appendix 8)

Between 1931 and 1933, Pālā'au 3 was fenced off and the Board of Commissioners began reforestation of the land with trees as follows:

1931	3,497 trees
1932	8,435 trees
1933	5, 130 trees
<hr/>	
17,062 on 40 acres	

In July 1933, the planting ceased when the Legislature failed to appropriate funds to continue the reforestation efforts.

In 1936, a nursery was started as part of the Emergency Conservation Work project, or the Civilian Conservation Corps and trees were grown for outplanting at Pālā'au 3. (Letter of Territorial Forester to Board of Commissioners of Agriculture and Forestry, May 18, 1936, see Appendix 8)

Photos on file in the State Division of Forestry and Wildlife addressed to Mr. William Crosby, Territorial Forester show Fig. 1, which is a photo taken by Assoc. Forester L.W. Bryan of Pālā'au in 1938. The caption reads, "1,665 ft. elevation CCC tree planting.

Type of cover shrub guava, lantana and akia." This reveals that akia was one of the species native to Pālā'au.

In 1939, the Civilian Conservation Corps began to plant Formosa koa (*acacia confusa*) in what is now the picnic area of the Pālā'au State Park; and ironwood (*casuarina glauca*) and equiseifolia) and paper-bark (*Melaleuca leucadendron*) along what is now the road and trails in the park. (information statement on Palaau Park Island of Molokai in Division of State Parks Pālā'au file).

A 1942 report of Territorial Forester William Crosby stated that the Civilian Conservation Corps planted 185,274 trees on 424.9 acres of the Pālā'au Section of the Moloka'i Forest Reserve between 1934 and 1941. (see Appendix 8)

The photo file in the State Division of Forestry and Wildlife addressed to Mr. William Crosby, Territorial Forester referred to above also shows Fig. 10 which is a photo of Pālā'au Park taken in January 15, 1952 by Forester M.F. Landgraf. The caption reads, "1,600 ft. elevation. Area cleared of trees, graded and ready for grass planting and construction work."

On June 29, 1955, Pālā'au 3 was established as Pālā'au Park under the Territorial Parks system.

3.4 Pala'au State Park

On June 29, 1955, the Board of Commissioners of Agriculture and Forestry of the Territory of Hawai'i adopted Resolution #7 which established the Pālā'au Section of the Moloka'i Forest Reserve as the Pālā'au Park under the Territorial Parks system. The resolution stated that "the presence of phallic rock formations of historic and legendary interest" and the scenic and historic features of Pālā'au made it of special interest and value as a park area." (See Appendix 5)

On December 27, 1984 Pālā'au Park was returned, together with various other parcels, to the Department of Hawaiian Home Lands by Governor's Executive Order no. 3270. (Memorandum dated May 22, 1987 from Mike Shimabukuro, Acting Land Management Administrator to Board of Land and Natural Resources, see Appendix 6)

In 1986, Phillips, Brandt, Redick & Assoc (PBR) prepared a Land Assessment of Pālā'au as part of the long range land use and management plan for Pālā'au for the Land Management Division of the Department of Hawaiian Home Lands. The report offered the Commission and the community five alternatives: (1) Leave management and maintenance of Pālā'au with the State Parks Division; (2) Take over management and maintenance of Pālā'au by DHHL; (3) Develop Pala'au for homesteading/agricultural use; (4) Exchange Pālā'au for other state lands; (5) Dispose of Pālā'au for income generating purposes by way of general lease, revocable permit or license. Input received from the community supported the disposition alternative with caution to thoroughly evaluate all proposals before withdrawing the land from State Parks' control. (PBR, 1986)

On May 1987, the Board of Land and Natural Resources approved and authorized execution of Hawaiian Home Lands License Agreement No. 215 covering the maintenance and operation of the Pālā'au State Park by the Department of Land and Natural Resources, Division of State Parks, Outdoor Recreation and Historic Sites. The term of the license was for five years commencing retroactively from December 28, 1986. (Memorandum dated May 22, 1987 from Mike Shimabukuro, Acting Land Management Administrator to Board of Land and Natural Resources, see Appendix 6)

The Kalaupapa overlook in Pālā'au State Park is a major tourist attraction. According to data collected by the State Parks Division, the park was visited by thousands of persons between June 1988 and June 1989. The data provided is as follows:

Jun 1988	3,686	Jan 1989	1,816
Jul 1988	4,221	Feb 1989	6,920
Aug 1988	1,356	Mar 1989	3,781
Sep 1988	2,875	Apr 1989	2,580
Oct 1988	2,180	May 1989	2,946
Nov 1988	4,476	Jun 1989	6,138
Dec 1988	3,510	Total:	46,485

The data sheet has a note by Wayne F. Ching which states that the numbers from the previous year was 187,768 rendering the numbers for 1988-89 low in comparison. He notes that the park was not closed but that it was a rainy year, or that human error may be a factor. (Ching, 1989)

Data collected on permits issued for camping at Pālā'au Park from April 1991 through March 1992 show that 296 persons camped at the park for 328 nights. Campers came from O'ahu, the U.S. continent and foreign countries.

Notes from 1992 located in the Pālā'au file at the Division of State Parks indicate that the division evaluated whether or not it should continue to operate the park or return the park to DHHL to manage. They noted that user fees did not cover operating costs and that the facilities were in disrepair. Upgrades to the water system, road, trail, pavilion and bathrooms were estimated to cost as much as \$1 million. Perhaps because it is the only state park on Moloka'i the decision was made to renew the license agreement with DHHL.

On May 25, 1993, the Hawaiian Homes Commission approved License Agreement No. 336 which was approved by the State Board of Land of Natural Resources on July 9, 1993 for the Department of Land and Natural Resources to operate, maintain and manage the Pālā'au State Park for recreational and park purposes. The License is for twenty years commencing retroactively to December 28, 1991 and terminating on December 27, 2011. The Department of Land and Natural Resources pays \$979.00 per annum for this license. (see License Agreement No. 336, Appendix 7 and 2008 Department of Hawaiian Home Lands 208 Annual Report, p. 83)

The October 2007 Regional Plan of the DHHL for the island of Moloka'i includes the development of a Cultural and Educational Community Center in Pālā'au at the Pālā'au State Park site. It states:

This center would perpetuate the traditional cultural practices of Hawai'i, but would be specific to the historical legacy of Moloka'i and Kalaupapa. DHHL envisions the community center to be a full-service center where charter schools or immersion schools could utilize the center in the daytime, other hālau and community could share it in the evenings and weekends. Further this center could integrate efforts of NPS to create a visitors' center that would provide educational programs and experiences without the necessity for visitors to physically visit and disturb the peninsula.

Given this projected use, it is unclear if Pālā'au State Park will continue to be managed by the Department of Land and Natural Resources or if management will be assumed by the Department of Hawaiian Homelands or a homestead community organization after December 27, 2011.

3.5 Natural Resources

Pālā'au State Park is classified as a State Conservation District and is zoned as Preservation by Maui County.

Originally Pālā'au was a lowland, dry and mesic forest, woodland and shrubland. Today it has been transformed by human activity. (Juvik and Juvik, 1998)

Photographs on file in the State Division of Forestry and Wildlife addressed to Mr. William Crosby, Territorial Forester shows Fig. 1, which is a photo taken by Assoc. Forester L.W. Bryan of Pālā'au in 1938. The caption reads, "1,665 ft. elevation CCC tree planting. Type of cover shrub guava, lantana and akia." This reveals that akia was one of the species native to Pālā'au. (see Appendix 10)

Another photo, Fig. 2, of Kalama'ula-Kahanui in 1938 states that the land was covered with lantana, guava, paumakani, naupaka, akia and pilo. Given that paumakani, naupaka, akia and pilo were in the adjacent ahupua'a of Kahanui, these plants may also have been native to Pālā'au. (see Appendix 10)

Figures 3, 4 and 5 are photos taken by Associate Forester M. F. Landgraf on February 15, 1952 of Kamiloloa-Kahanui and Kahanui. The captions state that the native flora consists of small Lehua, pilo, Ohia ha, paumakani, Ohelo, Akia, Kopiko and Alahee. These plants may also have been native to Pālā'au, since they grew in the adjacent ahupua'a of Kahanui. Figures 7 and 8 taken by Landgraf of Kahanui on the same day have captions that include Puu Keawe and Naupaka in the list of native plants. (See Appendix 10)

As noted above, the Civilian Conservation Corps planted Formosa koa (*acacia confusa*) in what is now the picnic area of the Pālā'au State Park; and ironwood (*casuarina glauca*) and equiseifolia) and paper-bark (*Melaleuca leucadendron*) along what is now the road and trails in the park. (information statement on Palaau Park Island of Molokai in Division of State Parks Pālā'au file).

A 1951 work plan by Colin Lennox, President of the Territorial Board of Agriculture and Forestry outlined work projects and the type of plants to be introduced into the park prior to its opening to the public. These plants included kikuyo grass, shell ginger, philodendrons, a hedge of Monterey Cypress, and paper bark trees.

A map of the Pālā'au Park attached to the 1955 Resolution 7 which established the Pālā'au Park shows an arboretum in the park, on the south side of the road near to the site of the present pavilion. A 1962 letter from J.M. Souza, Jr., Supervisor for State Parks Maintenance and Operations refers to an arboretum in the Pālā'au State Park. In the letter he asks Park manager Leroy Mollena to ask Mr. Peter, the Forester on Molokai, for a map showing where the trees in the arboretum are planted so that they can all be labeled.

A 1968 report for the U.S. Forest Service, Plantation Timer on the Island of Molokai - 1967 by Wesley Wong, Robert Nelson and Herbert Wick described the Pālā'au Park as a "Forest Plantation in which planted forests comprise at least 10 percent of the growing space occupied regardless of native species predominance." It also provides a map (Figure 3) which shows the location of the various types of trees planted in the forest - Formosan Koa; Ironwood; Monterey Cypress; Robusta Eucalyptus; Paper Bark; and Eucalyptus. The report considered the forest non-commercial. Formosan Koa, Ironwood, Monterey Cypress and Paperbark are non-commercial trees. Stands of Eucalyptus and Robusta Eucalyptus which are commercial hardwoods comprise only a portion of the park and were not intended for commercial use. The Eucalyptus and Robusta Eucalyptus, according to the map in the report are not located in the project area. According to the map, non-commercial Paper Bark and Formosan Koa are planted in the project area.

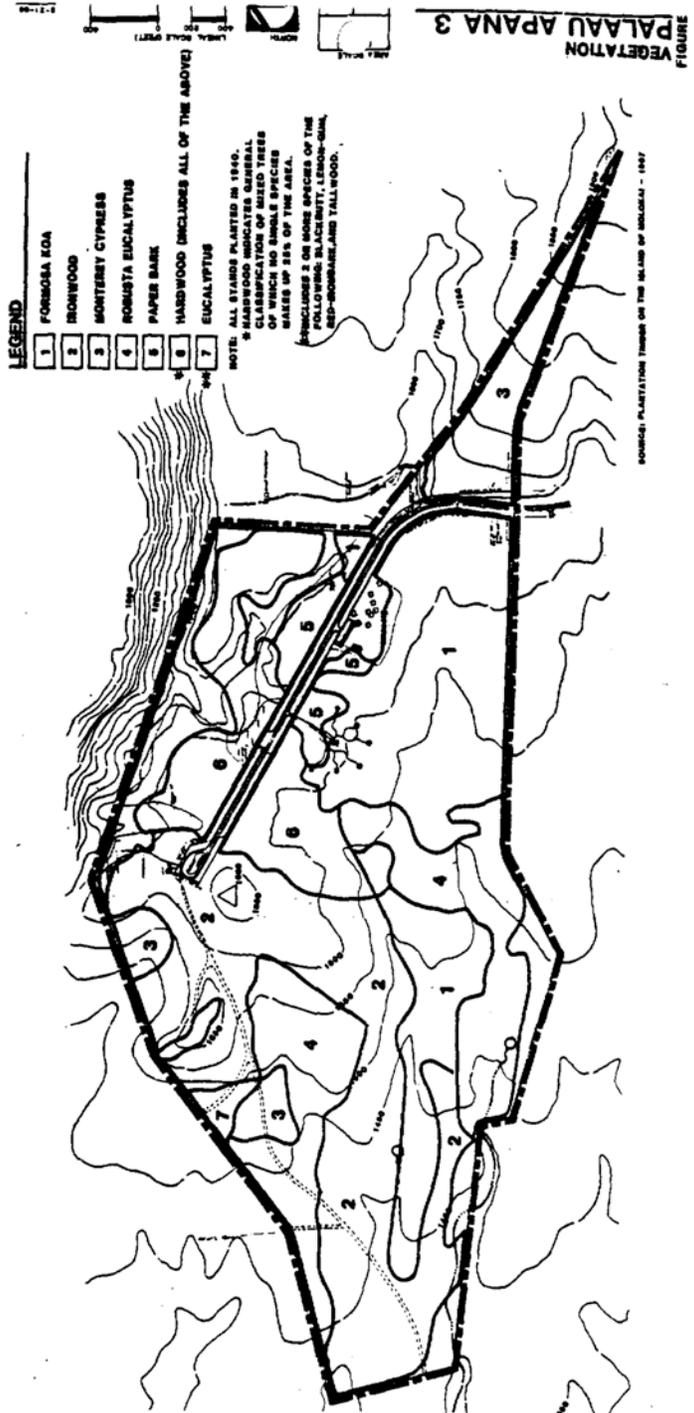


Figure 5. Location of trees planted in Pālā'au State Park

3.6 Cultural Resources and Mo'olelo

3.6.1 Nanahoa Complex

Kauleonanahoa

According to the Summers, Kauleonanahoa is one of the finest examples of phallic stones found throughout the Hawaiian Islands. Before the reforestation program of the 1930s, Kauleonanahoa which literally means "the penis of Nanahoa" could be seen prominently on the skyline for several miles from the south.

Summers quotes Stokes' description as follows:

The stone appeared to me to be a natural formation . . . There was, however, some artificial work on the stone, i.e. a slight hammering on the blunt ridge underneath the head, where the latter joined the neck; although the surface thus formed did not seem as ancient as the rest of the stone. (Summers, 1971, 28)

Coelho wrote an account of Nanahoa in *Ka Nupepa Ku'oko'a* which Summers translated as follows:

In the beginning Kaunanahoa and his wife [Kawahuna] lived where the Nanahoa (stone) stands. One day, a peculiar but beautiful woman appeared and went up there. As she prayed and offered her gifts, she glanced up-ward and saw Nanahoa blinking his eyes at her. She climbed up to the top where the plain of Kaiolohia could be easily seen and there she peered into a small pool.

As she sat admiring the incomparable beauty of the small pool, Kawahuna's hands reached out and grabbed her by the hair. As they struggled, Nanahoa lost his temper and gave the woman whose right (husband) he was [Kawahuna] a hard slap. She staggered back and rolled down the cliff side into a depression at the foot . . .

That was how they became separated to this day. Nanahoa stands alone on the hill and Kawa-huna lies alone on the plain. What a pity. The husband was at fault and the wife suffered for it and both became stones to this day. (Summers, 1971, 28 - 30)

Summers also quoted Coelho's account of the significance of Nanahoa for women who wish to conceive a child:

. . . the few chiefs who remained saw that there was no people to gather to their presence and that the women did not give birth, the kahunas were asked to appeal to the gods for the race to revive. Through revelation received, all the women who were not pregnant were commanded to go to Pu'u Lua with their offerings to give to Kaunanahoa and his companion. They spent the night at the base of the

wonderful (stone) and when they went home each was pregnant. Each had a bundle to carry home. (Summers, 1971, 30)

Summers reported that several stones, representing the female organ, were found near Kauleonanahoa and were taken to the Bishop Museum. According to Summers, the stones were brought to Nanahoa to get mana; they were taken back to the home to make the crops and animals productive, not necessarily human beings. (Summers, 1971, 30)

Phelps states that, "the rock was believed to make barren women fertile and as a precaution newly-wedded women would sit on it one night." He writes of a legend, "that there was once a woman of that district (a chiefess according to some) who complained of finding no lover capable of satisfying her desires. One day she met a man named Nanahoa and it is from his penis that the rock was formed. (Phelps, 1937, 24)

Aunty Harriet Ne spoke of "Kaulu Nanahoa" who was the prince of Nā'iwa. Kaulea was his sister. Nanahoa used to tease his sister every time she made tapa by praying for the rain to come and ruin it. When she put her tapa out to dry, the rain came and spoiled it. The rain belt is from Pu'u Nanahoa down to the high school, to the airport and then up to Maunaloa. She asked a kahuna for help and he instructed her to make a rain heiau to bake the rain so that when it fell it would not ruin her tapa.

In her book, Tales of Molokai: The Voice of Harriet Ne, she provided the following account of Nānāhoa.

If you pass through Kualapu'u to the forest, you can see the great rock six feet high which is called Kaule o Nānāhoa which means "the penis of Nānāhoa." Nānāhoa was a prince who lived on the Twin Hill and protected the rock because it was on his property. Also, it was precious to his people because it was know to cure infertility. But for him - and not only for him - it was a sorrow. He was married to a beautiful woman, and they were very happy until another woman came from another district. Nānāhoa did not resist her loving glances, and soon they became lovers. The heart of his wife burned hotly within her; and when she found them together at the rock, she cried out in rage and hurled bitter acusations at them. The she sprang at the woman and pushded her down the cliff. Even today, if you there, you will find a perfectly formed female rock. I myself have seen it. (Ne, Cronin,1992,63)

Petroglyphs

Summers writes of more than 24 petroglyphs on boulders to the east and northeast of Kauleonanahoa. The majority of figures are of humans and range in size from 5 to 24 inches.

Holua Slide

Summers describes a 200 foot holua slide on the southern slope of Nanahoa hill. It was unpaved and did not have a platform. A photograph taken by Stokes in 1919 and

published in Summers shows the course before the tree planting program. Trees now cover the course and the hill where it ran.

Kawahuna or Nawa'akaluli/Nawa'akaluhi or Waihue'hu'e

This is a female phallic stone located on the northwest slope of Nanahoa hill. According to Summers, this was the stone called Kawahuna by Coelho. It was called Nawa'akaluli by Stokes and Waihu'ehu'e by Emory. Emory was told that as long as she stands there, Nanahoa representing the penis, will stand erect.

3.6.2 Kalaupapa Lookout

A map of the Pālā'au Park attached to the 1955 Resolution 7 which established the Pālā'au Park shows a trail to a Kalaupapa Lookout in the vicinity of the proposed project area.

The Kalaupapa Lookout is presently located at the northern end of the main road. Access to the lookout is via a footpath from the paved parking lot. In September 1985 the National Park Service improved the lookout with a concrete walkway and stone wall. In 1986 a series of informational exhibit panels were installed to provide a history of the Kalaupapa Peninsula and Hansen's disease.

As noted above, the Kalaupapa Lookout is the principal attraction in the Pālā'au State Park which annually attracts thousands of visitors.

3.7 Cultural Activities

Persons interviewed expressed concern about protecting the Nānāhoa Complex from inappropriate use. The cultural practitioner group convened to help plan the Ala Pālā'au project, discussed the potential of getting rid of the ironwood trees and restoring the Nānāhoa complex with native plants and preventing people from climbing all over it. They also expressed interest in re-installing the signage which told the mo'olelo of Nānāhoa and Kawāhuna and asked visitors to approach and treat the area with proper respect.

Inquiries with cultural practitioners about if there is an individual, 'ohana or organization who serves as the kahu for the Nānāhoa Complex revealed that no one currently fulfills this responsibility. Identifying a hui of persons who would be willing to take responsibility for the Nānāhoa complex would be a first step in transferring its oversight from the DLNR Park caretaker to the DHHL. Some informants noted that because the educational activities of this planting project will involve elementary schools and families, that it should not be located neat the Nānāhoa Complex. Locating the planting project in the northeast sector of the park is appropriate for the elementary school age group.

Cultural practitioners spoke of gathering plants in the Pālā'au Park for lei. The proposed project which will focus on removal of invasive species and the cultivation of native plant species which will enhance this activity. The cultural practitioner group convened to help plan the Ala Pālā'au project, suggested the involvement of hālau hula in the planting project to advise on the type of plants to cultivate for their gathering needs. They also suggested the cultivation of plants relevant to the mo'olelo of the area, such as the 'iwa fern for which Nā'iwa is named.

According to persons interviewed, subsistence hunting, primarily for deer, has continued in the park even though it is not allowed. Some hunters start out in the park past the first pavilion, by the camping site and go on trails from that point into the undeveloped section of the park, south of the road. Another point to reach the hunting trails is past the phallic rock, along the old pineapple road. The proposed project area is located outside of the area utilized for subsistence hunting. The alternate route considered might have interfered with these hunting activities.

The October 2007 Regional Plan of the DHHL for the island of Moloka'i includes the development of a Cultural and Educational Community Center in Pālā'au at the Pālā'au State Park site. It states:

This center would perpetuate the traditional cultural practices of Hawai'i, but would be specific to the historical legacy of Moloka'i and Kalaupapa. DHHL envisions the community center to be a full-service center where charter schools or immersion schools could utilize the center in the daytime, other hālau and community could share it in the evenings and weekends. Further this center could integrate efforts of NPS to create a visitors' center that would provide educational

programs and experiences without the necessity for visitors to physically visit and disturb the peninsula.

If this regional plan is implemented, then Pālā'au would become a site for cultural education, training and programs and expand the use of the park by the broader community, especially the Native Hawaiian community.

Cultural practitioners and kūpuna who were interviewed did not know of any cultural sites located in the project area. They advised that cultural protocols be followed should any cultural artifacts or cultural sites, especially burials be uncovered during the course of the removal of invasive species, planting of native species and development of interconnecting paths.

Section 4 Findings

1. The primary cultural sites in the Pālā'au State Park area are part of the Nānāhoa Complex. These include the male phallic stone (SIHP #50-30-06-0001); more than 24 petroglyphs (SIHP# - 002); a holua slide (SIHP#-003); and a female phallic stone (SIHP # - 004). This complex is located in the northwestern part of the park past the parking lot. The project area, is located in the northeastern part of the park near the entrance and is a considerable distance away from the complex. The construction and public use of the proposed project area should not have an impact on the Nānāhoa Complex.
2. According to past and present archaeological studies and oral history sources, the project area itself is not known to have specific traditional cultural sites.
3. Pālā'au State Park is accessed for traditional and customary subsistence hunting in areas south of the main road and west of the Nanahoa Complex. The project area, north of the main road and east of the Nanahoa Complex, is NOT accessed for traditional and customary subsistence hunting.
4. Pālā'au State Park is accessed for traditional and customary gathering of native plants for cultural, spiritual and healing purposes. The proposed project will enhance the native plant communities in the park.
5. The Department of Hawaiian Homelands (DHHL) owns the 233.680 acres of land which comprise the Pālā'au State Park. The lands are leased to the Department of Land and Natural Resources under Lease No. 336 from December 28, 1991 through December 27, 2011, for \$989.00 per annum.

The October 2007 Regional Plan of the DHHL for the island of Moloka'i includes the development of a Cultural and Educational Community Center in Pālā'au at the Pālā'au State Park site. It states:

This center would perpetuate the traditional cultural practices of Hawai'i, but would be specific to the historical legacy of Moloka'i and Kalaupapa. DHHL envisions the community center to be a full-service center where charter schools or immersion schools could utilize the center in the daytime, other hālau and community could share it in the evenings and weekends. Further this center could integrate efforts of NPS to create a visitors' center that would provide educational programs and experiences without the necessity for visitors to physically visit and disturb the peninsula.

Given, this plan, it is important for this project to receive input and support from the Moloka'i homestead community and DHHL, so that it will complement and enhance the future uses projected in the DHHL Regional Plan.

6. Pālā'au State Park is utilized by neighboring families; Native Hawaiian cultural practitioners; school groups; Hawaiian Homesteaders.
7. Community groups may have use for the invasive trees that will be removed for the native planting project for construction of hālau.
8. Native plants identified as growing in Pālā'au and Kahanui historically include small Lehua, pilo, Ohia ha, paumakani, Ohelo, Akia, Kopiko, Alahee, Puu Keawe and Naupaka. The 'iwa fern is connected with Nā'iwa

Section 5 Recommendations

1. Focus the project on the removal of invasive trees and native plant restoration with connecting paths to facilitate the plantings and their propagation and growth in the northeast sector of the park.
2. Develop the project with input and support from the Moloka'i homestead community and DHHL.
3. Form a cultural working group to develop the planting project comprised of members of the Moloka'i homestead community; neighboring residents and landowners, i.e. the Meyer 'Ohana and the National Park Service; park users; Native Hawaiian cultural practitioners; and educators.
4. If feasible, invite community groups to haul away the invasive trees that will be removed for the native planting project.
5. If burials are inadvertently uncovered in the course of implementing the project, the appropriate cultural and legal protocols established by Hawaiian custom and practice and applicable state and federal laws should be followed. As Hawaiian Home Lands, the process established under the Native American Graves Protection and Repatriation Act (NAGPRA) needs to be followed if any human remains are inadvertently discovered during the project. Work should immediately stop and the DHHL notified. DHHL will act in accordance with NAGPRA. Remains will not be removed without approval. All decisions regarding the disposition and treatment of Native Hawaiian human remains will be made by DHHL in accordance with NAGPRA. As a courtesy a Division of State Parks archaeologist may be contacted as well as the State Historic Preservation Division.
6. If cultural sites are inadvertently discovered in the course of implementing the project, appropriate cultural protocol should be followed and the discoveries shall be documented. Any artifacts shall be catalogued and turned over the DHHL.
7. Among the plants to include in the project should be native plants identified as growing in Pālā'au and Kahanui historically such as small Lehua, pilo, Ohia ha, paumakani, Ohelo, Akia, Kopiko, Alahee, Pua Keawe and Naupaka. There is also the 'iwa fern for which Nā'iwa is named.

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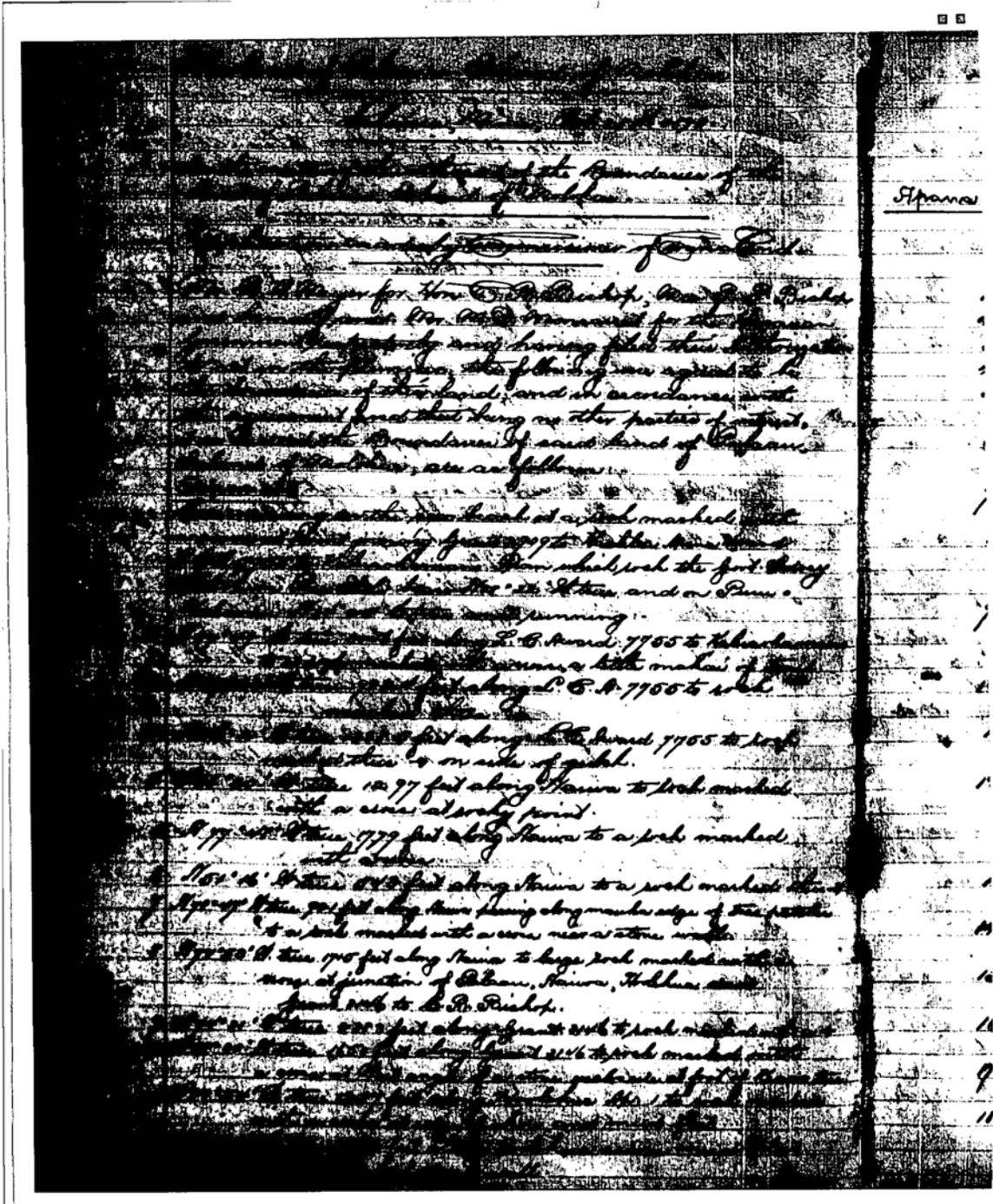
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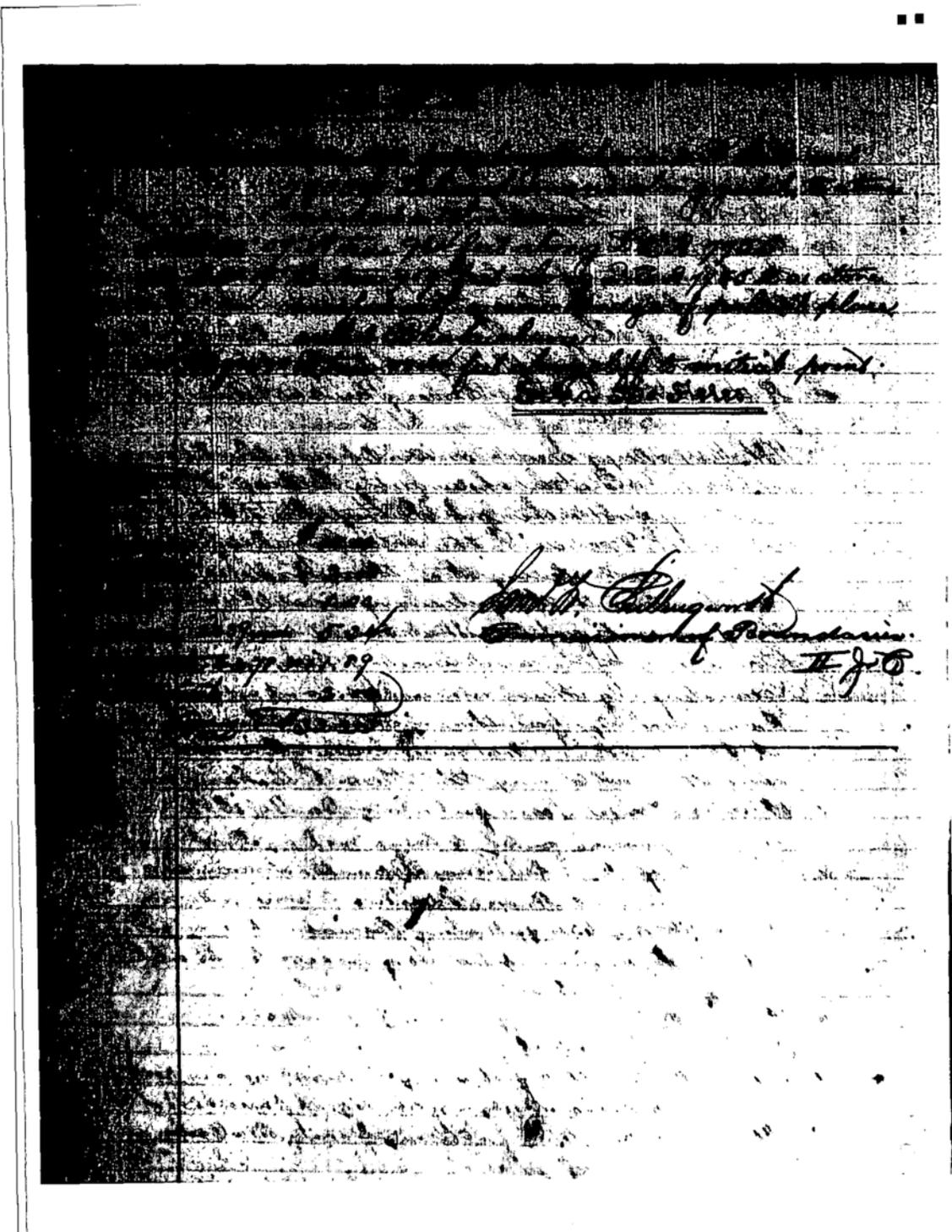
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Appendix 1. Description of the Boundaries recorded for Pālā'au Apana 3 on February 28, 1889 in the Boundary Commission Book - MFL 86 DLNR Boundary Commission Book, Box 2 . Flash No. 3 Vol. 2 Maui





Appendix 2. Certificate 82 of Maui Boundaries, Island of Molokai, District of Molokai, Land of Palaa, Decision rendered February 28, 1889 by S. Chillingworth Esq, Commissioner of Boundaries, Islands of Maui, Molokai, Lanai

*Certificate
of Maui 82
Boundaries*

*Island of Molokai
District of Molokai
Land of Palaa*

Decision

rendered

February 28, 1889.

by

S. P. Chillingworth Esq.

*Commissioner of
Boundaries*

*Islands of Maui,
Molokai, Lanai.*

with a cross at point joining Grand 2001 to Kua-
 lea Kama Tunnel L.C.A. 7755 to Tahurokaman
 Pass, which rocks the foot Queen Station on Puu
 Olu bears. 188° 32' N. true and on Puu o Kahani

164° 25' E. true and running:

1. 139° 49' E. true 3016 ft. along L.C. Awaed 7755 to
 Taluakamans to a rock marked with a cross, a little
 makai of trail.
2. 169° 21' E. true 913.4 ft. along L.C.A. 7755 to rock
 marked thus →
3. 136° 2' E. true 1338.5 ft. along L.C.A. 7755 to rock
 marked thus → on side of gulch.
4. 168° 20' W. true 1277 ft. along Naiwa to rock marked
 with a cross at rocky point.
5. 177° 48' W. true 1777 ft. along Naiwa to a rock marked
 with a cross.
6. 151° 16' W. true 543 ft. along Naiwa to a rock marked thus →
7. 178° 14' W. true 921 ft. along " passing along mauka
 edge of tate patch to a rock marked with a cross
 near a stone wall.
8. 172° 53' W. true 1715 ft. along Naiwa to large rock
 marked with a cross at junction of Palaeau,
 Naiwa, Hokhua and Lyr. 3146 to C.R. Bishop.
9. 274° 51' W. true 2388 ft. along Lyr. 3146 to rock
 marked with a cross.
10. 238° 30' W. true 1650 ft. along Grand 3146 to rock
 marked with a cross at head angle of a
 stone enclosure at foot of Kuaui tree.

11. S 21° 54' E. tree 1287 ft. along Kōhūka ʻĀpara I
to rock marked with a cross at edge of shore
and mud flat.

12. S 21° 54' E. tree 1500 ft. along Kōhūka ʻĀpara
mud flat to old fish pond wall.

13. Thence along old fish pond wall and shore to
initial point. The bearing and distance
from rock marked with a cross at edge of
shore and mud flat to initial point being
S 72° 44' E. tree. 5452 feet.

Area 512 Acres.

ʻĀpara 2. Commencing at a cross on a stone under a pile
of stones at the sea shore of a place called
Moomoou. From which stone the first Survey
Sta. Mounaloo bears S 12° 16' N. tree thence:-

1. S 1° 54' N. tree 1221 ft. along Paluakoi fr. 3146 to C. P. Dick.

2. S 1° 35' N. " 1023 " " same.

3. S 10° 48' E. " 3003 " " "

4. S 8° 35' E. " 10070 " " "

5. S 31° 32' E. " 5410 " " " to rock marked
at edge of gulch.

6. S 75° 16' E. tree 4284 ft. along fr. 3146 along edge
of gulch to stone marked with a cross.

7. S 4° 18' E. tree 4199 feet along fr. 3146 across point
of gulch to rock marked on S.E. edge of gulch.

8. S 41° 15' E. tree 1672 ft. along fr. 3146 to an iron
pin at a rock marked with a cross. From
which the first Survey Station "South Base"
bears N 51° 56' E. tree 1107 feet.

- considerable. ~~180~~ bears $S 34^{\circ} 13' W$. tree
 Pua Lua bears $N 97^{\circ} 10' E$. tree and Pua
 Luahine bears $S 28^{\circ} 34' E$. tree.
19. $S 25^{\circ} 47' W$. tree 1248 feet along Hoolehua across
 gulch to a stone mid tree \rightarrow at edge of same.
20. $S 79^{\circ} 00' W$. tree 1005 ft. along Hoolehua to a stone
 marked thus \rightarrow
21. $S 57^{\circ} 37' W$. tree 799 ft. along Hoolehua to a cross on
 a stone at a place of stone near gulch.
22. $S 65^{\circ} 39' W$. tree 1095 feet along Hoolehua along ridge
 of gulch to a cross on a stone.
23. $S 50^{\circ} 18' W$. tree 880 ft. along Hoolehua along edge
 of gulch to rock marked thus \rightarrow
24. $S 32^{\circ} 10' W$. tree 570 ft. along Hoolehua along edge
 of gulch to rock marked with a cross on
 West side of gulch at its mouth at place
 called Haina hails.
25. $S 65^{\circ} 22' E$. tree 321.4 ft. along Haina Gr. I across
 mouth of gulch to rock marked thus \rightarrow
 on opposite side of gulch.
26. $N 11^{\circ} 50' E$. tree 1443 ft. along Haina along edge
 of gulch to rock marked with a cross.
27. $N 16^{\circ} 44' E$. tree 926 ft. along Haina along edge
 of gulch to cross on a stone.
28. $N 53^{\circ} 45' E$. tree 1323 ft. along Haina along edge
 of gulch to rock mid tree \rightarrow on edge of gulch.
29. $S 85^{\circ} 36' E$. tree 535 ft. along Haina to rock mid
 with a cross at East corner of small house

8. $1164^{\circ}04'$ C. tree 663 feet along *Stairwa* along edge of gulch to cross on a stone.
9. $1166^{\circ}51'$ C. tree 266 feet along *Stairwa* passing a little South of this house and up slope to rock marked thus →
10. $1167^{\circ}32'$ C. tree 1635 feet along *Stairwa* to rock marked thus → From which, rock to Fort Surrency Blw. *Seobuwa* bears $1165^{\circ}54'$ C. tree and *Puu* (D) $1179^{\circ}38'$ C. tree.
11. $1157^{\circ}13'$ C. tree 162 ft. along *Sakanui* L.C.A. 7-55 to *Kalus* *Kamano* along gulch, to stone marked with a cross.
12. $1152^{\circ}07'$ C. tree 964 ft. along L.C. Road 7-55
13. $115^{\circ}17'$ C. tree 917 " " " " " 7-55 to a stone marked with a cross at edge of pali at place called *Pohn* *Kuwkane*.
14. $1149^{\circ}12'$ C. tree 224 ft. along cliff to initial point.

Area 3331 Acres.

Area should be
230 acres
see map
11/2

I do adjudge and decree that the foregoing are the true and legal boundaries of the land of Palau, Island of Uluklai
Wm. W. Chittenden

Likiep, Mar 25 1859

Commissioner of Boundaries 276

Appendix 3. Resolution #9 of the Hawaiian Homes Commission transferring Pālā'au Apana 3 to Commissioner of Public Lands of the Territory of Hawai'i, August 15, 1929

511
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P
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See HERE
Vol 1

RESOLUTION #9

WHEREAS, under Section 203 of the Hawaiian Homes Commission Act, 1920, (Revised Laws of Hawaii, 1925, Sec. 532) and Section 204 of said Act (Revised Laws of Hawaii, 1925, Section 533), as amended by the Act of Congress of March 7, 1928 (70th Cong. Sess. 1, Ch. 142,) the public lands hereinafter described were and are set aside and made available for the purposes of said Act; and

WHEREAS, said lands hereinafter described are not, at the present time, leased as authorized by the provisions of said Hawaiian Homes Commission Act; and

WHEREAS, good cause appears for the return of said lands hereinafter described to the control of the Commissioner of Public Lands of the Territory of Hawaii, in accordance with the provisions of said Section 204, as amended, and Section 212 of said Hawaiian Homes Commission Act (Section 541, Revised Laws of Hawaii, 1925):

NOW, THEREFORE, BE IT RESOLVED BY THE HAWAIIAN HOMES COMMISSION:

That the lands hereinafter described by metes and bounds, said lands being also so described on plans and descriptions thereof on file in the office of the Territorial Survey Department of the Territory of Hawaii, be, and they hereby are, transferred, set over and returned to the Commissioner of Public Lands of the Territory of Hawaii and to his control, in accordance with the provisions of said Section 204 as amended, and Section 212 of said Hawaiian Homes Commission Act (Section 541, Revised Laws of Hawaii, 1925), to the full extent allowed by law and said Act. The said lands hereby returned to the control of the Commissioner of Public Lands are described as follows:

The government land of Palaau (Apana 3), and portion of Kalaupapa, under the jurisdiction of the Hawaiian Homes Commission

on the Island of Molokai, more particularly described as follows:

The government land of Palaau (Apana 3), and portion of Kalaupapa, under the jurisdiction of the Hawaiian Homes Commission on the Island of Molokai, more particularly described as follows:

PARCEL 1: Being the land of Palaau, Apana 3. Commencing at a stone marked ↗ at edge of cliff. From which the Government Survey Station Puu Lua bears S. 56° 05' W. true Keolewa bears S 84° 42' E. true and Puu Olelo bears S 62° 22' E. true and running:-

1. S. 72° 27' W. true 1133 feet along Naiwa Apana 3 across gulch to large rock on North slope of Puu Lua marked with a cross at a place called Nawaakaluhi;
2. S. 54° 50' W. true 1310 feet along Naiwa.
3. S. 76° 45' W. true 1029.6 feet along Grant 2557 to Haalelea in Manowainui;
4. S. 11° 40' E. true 742.5 feet along Grant 2557;
5. S. 82° 55' E. true 1458.6 " " " " ;
6. S. 90° 35' E. true 191.4 " " " " across gulch to point at edge of gulch at place called Pipilo;
7. S. 72° 27' E. true 1029 feet along Naiwa Apana 1 along edge of gulch;
8. N. 64° 04' E. true 683 feet along Naiwa along edge of gulch to cross on a stone;
9. S. 86° 51' E. true 2096 feet along Naiwa passing a little South of Ku's house and up slope to rock marked thus ↗ .
10. S. 67° 52' E. true 1635 feet along Naiwa to rock marked thus ↗ from which rock the Government Survey Station Keolewa bears N 65° 54' E. true and Puu Olelo S 79° 38' E. true.
11. N. 57° 13' W. true 1672 feet along Kahanui L.C.A. 7755 to Kaluaokamano along gulch to stone marked with a cross;
12. N. 52° 07' W. true 964 feet along L.C.Award 7755;
13. N. 5° 17' E. true 919 " " " " 7755 to a stone marked with a cross at edge of pali at place called Pohakuokane;
14. N. 69° 42' W. true 2244 feet along cliff to initial point;

AREA 330 ACRES as per Boundary Certificate No. 82.

CORRECT AREA 230 ACRES.

on the Island of Molokai, more particularly described as follows:

The government land of Palaau (Apana 3), and portion of Ka-laupapa, under the jurisdiction of the Hawaiian Homes Commission on the Island of Molokai, more particularly described as follows:

PARCEL 1: Being the land of Palaau, Apana 3. Commencing at a stone marked ↗ at edge of cliff. From which the Government Survey Station Puu Lua bears S. 56° 05' W. true Keolewa bears S 84° 42' E. true and Puu Olelo bears S 62° 22' E. true and running:-

1. S. 72° 27' W. true 1133 feet along Naiwa Apana 3 across gulch to large rock on North slope of Puu Lua marked with a cross at a place called Nawaakaluni;
2. S. 54° 50' W. true 1310 feet along Naiwa.
3. S. 76° 45' W. true 1029.6 feet along Grant 2557 to Haalelea in Manowainui;
4. S. 11° 40' E. true 742.5 feet along Grant 2557;
5. S. 82° 55' E. true 1458.6 " " " " ;
6. S. 90° 35' E. true 191.4 " " " " across gulch to point at edge of gulch at place called Pipilo;
7. S. 72° 27' E. true 1029 feet along Naiwa Apana 1 along edge of gulch;
8. N. 64° 04' E. true 683 feet along Naiwa along edge of gulch to cross on a stone;
9. S. 86° 51' E. true 2606 feet along Naiwa passing a little South of Ku's house and up slope to rock marked thus ↗ .
10. S. 67° 52' E. true 1625 feet along Naiwa to rock marked thus ↗ from which rock the Government Survey Station Keolewa bears N 65° 54' E. true and Puu Olelo S 79° 38' E. true.
11. N. 57° 13' W. true 1672 feet along Kahanui L.C.A. 7755 to Kaluaokamano along gulch to stone marked with a cross;
12. N. 52° 07' W. true 964 feet along L.C.Award 7755;
13. N. 5° 17' E. true 919 " " " " 7755 to a stone marked with a cross at edge of pali at place called Pohakuokane;
14. N. 69° 42' W. true 2244 feet along cliff to initial point;

AREA 330 ACRES as per Boundary Certificate No. 82.

CORRECT AREA 230 ACRES.

As described in Boundary Certificate No. 82.

PARCEL 2. Being a portion of the land of Kalaupapa above the 500 foot contour. Beginning at the Southwest corner of this parcel of land, being also the Northwest corner of Nāiwa Apana 3, L.C.A. 11216 Apana 12 to Kekauonohi and at the top edge of the cliff, thence running as follows:-

1. In a Northerly direction for a distance of 750 feet more or less along the land of Kipu to a point on the 500 foot contour;
2. Thence in an Easterly direction along the 500 foot contour along the remainder of Kalaupapa, to the West boundary of Makanalua, the direct distance being 13250 feet more or less;
3. Thence up the pali in a Southerly direction for a distance of 2800 feet more or less along the land of Makanalua to the top edge of the cliff;
4. Thence in a Westerly direction along the top edge of the cliff along the lands of Iloli Apana 2, Kahanui, Palasau Apana 3, and Nāiwa Apana 3 to the point of beginning, the direct distance being 14000 feet more or less.

AREA 380 ACRES MORE OR LESS.

Compiled from
Topographic map of
the Is. of Molokai.

(Sgd) N.E. Newton, Deputy Surveyor.

DATED at Honolulu, T. H., this 15th day of August, 1929.

(Sgd) Lawrence M. Judd
Chairman, Hawaiian Homes
Commission.

I certify that the foregoing Resolution was duly adopted by the Hawaiian Homes Commission on the 15th day of August, 1929, at a meeting of said Commission duly held on said date.

(Sgd) R. M. Duncan
Executive Officer and Secretary,
Hawaiian Homes Commission.

Appendix 4. Boundary Certificate 82, September 18, 1952



TERRITORY OF HAWAII
SURVEY DEPARTMENT
HONOLULU

C.S.F. No. 11,524

September 18, 1952

Government (Crown) Land of Palaau
Apana 3, Boundary Certificate 82
Palaau, Molokai, T. H.

Being also Parcel 1 (Hawaiian Home Land of Palaau, Molokai) transferred to the Commissioner of Public Lands by Resolution No. 9, duly adopted on August 16, 1929, by the Hawaiian Homes Commission.

Beginning at the East corner of this parcel of land, on the common boundary of the lands of Kahanu (L.C.Aw. 7755 Apana 6 to Kaluaokamano) and Naiwa, Apana 1 of Boundary Certificate (L.C.Aw. 11216 Apana 12 to M. Kekauonohi) the coordinates of said point of beginning referred to Government Survey Triangulation Station "KILOHANA" being 2414.05 feet South and 4341.69 feet East, as shown on Government Survey Registered Map 2989 and running by azimuths measured clockwise from True South:

1. 112° 08' 30" 1636.7 feet along L.C.Aw. 11216 Apana 12 to M. Kekauonohi to "7" on set stone;
2. 93° 13' 2605.9 feet along L.C.Aw. 11216 Apana 12 to M. Kekauonohi to "7" on large rock;
3. 64° 04' 683.0 feet along L.C.Aw. 11216 Apana 12 to M. Kekauonohi, the direct azimuth and distance from the end of this course to a pipe being:
181° 19' 67.54 feet;
4. 107° 36' 1031.0 feet along L.C.Aw. 11216 Apana 12 to M. Kekauonohi to "+" on set stone at place called Pipilo;
5. 170° 25' 191.4 feet along Grant 2557 to Levi Haalelea to a pipe;
6. 97° 05' 1458.6 feet along Grant 2557 to Levi Haalelea;

7.	166° 20'	732.8 feet	along Grant 2557 to Levi Haalelea;
8.	256° 45'	1029.6 feet	along Grant 2557 to Levi Haalelea to a pipe;
9.	234° 50'	1310.0 feet	along L.C.Aw. 11216 Apana 12 to M. Kekauonohi to "+" on large rock;
10.	252° 27'	1133.0 feet	along L.C.Aw. 11216 Apana 12 to M. Kekauonohi;
11.	289° 56' 30"	2264.7 feet	along Cliff (Hawaiian Home Land of Kalaupapa and remainder of Molokai Forest Reserve) to "+" on set stone;
12.	5° 12'	919.9 feet	along L.C.Aw. 7755 Apana 6 to Kaluaokamano to "/" on set stone;
13.	307° 55'	964.6 feet	along L.C.Aw. 7755 Apana 6 to Kaluaokamano to "+" on set stone;
14.	302° 49'	1674.7 feet	along L.C.Aw. 7755 Apana 6 to Kaluaokamano to the point of beginning and containing an Area of 233.68 Acres.

Compiled from Gov't. Reg. Map 2989,
CSF 5438, Boundary Certificate 82,
and other Gov't. Survey records.

TERRITORY OF HAWAII
SURVEY DEPARTMENT

By *Francis H. Kanahelo*
Francis H. Kanahelo
Senior Geodetic Engineer
ry

Appendix 5. Resolution No. 7 establishing the Palaau Park under the Territorial Parks system, June 29, 1955

Territory of Hawaii
Board of Commissioners of Agriculture and Forestry
DIVISION OF PARKS

RESOLUTION NO. 7

PAALAU PARK, MOLOKAI

WHEREAS, the Palaau Section of the Molokai Forest Reserve is of particular interest in its location along the northern cliffs of the island of Molokai and in the presence of phallic rock formations of historic and legendary interest, and

WHEREAS, the scenic and historic features of this area make it of special interest and value as a park area,

NOW, THEREFORE, BE IT RESOLVED, that the following described area be and is herewith established as the Palaau Park under the Territorial Parks system:

PAALAU PARK
Palaau, Molokai

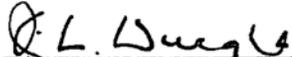
Beginning at a \neq on stone at edge of gulch at a place called "Pilopilo," being the intersection of the boundaries of the lands of Manowainui, Palaau and Naiwa, the coordinates of said point of beginning referred to Government Survey Triangulation Station "Puu Lua" being 1836.1 feet South and 659.8 feet West, as shown on Government Survey Registered Map No. 1728, and running by true azimuths;-

1. 166° 30' 339.6 feet across gulch and along the land of Manowainui to a pipe;
2. 96° 29' 1453.2 feet along the land of Manowainui to a pipe;
3. 169° 34' 748.3 feet along same to a pipe;
4. 260° 00' 1029.4 feet along same to a pipe;
5. 234° 50' 1310.0 feet along the land of Naiwa Apana 3;

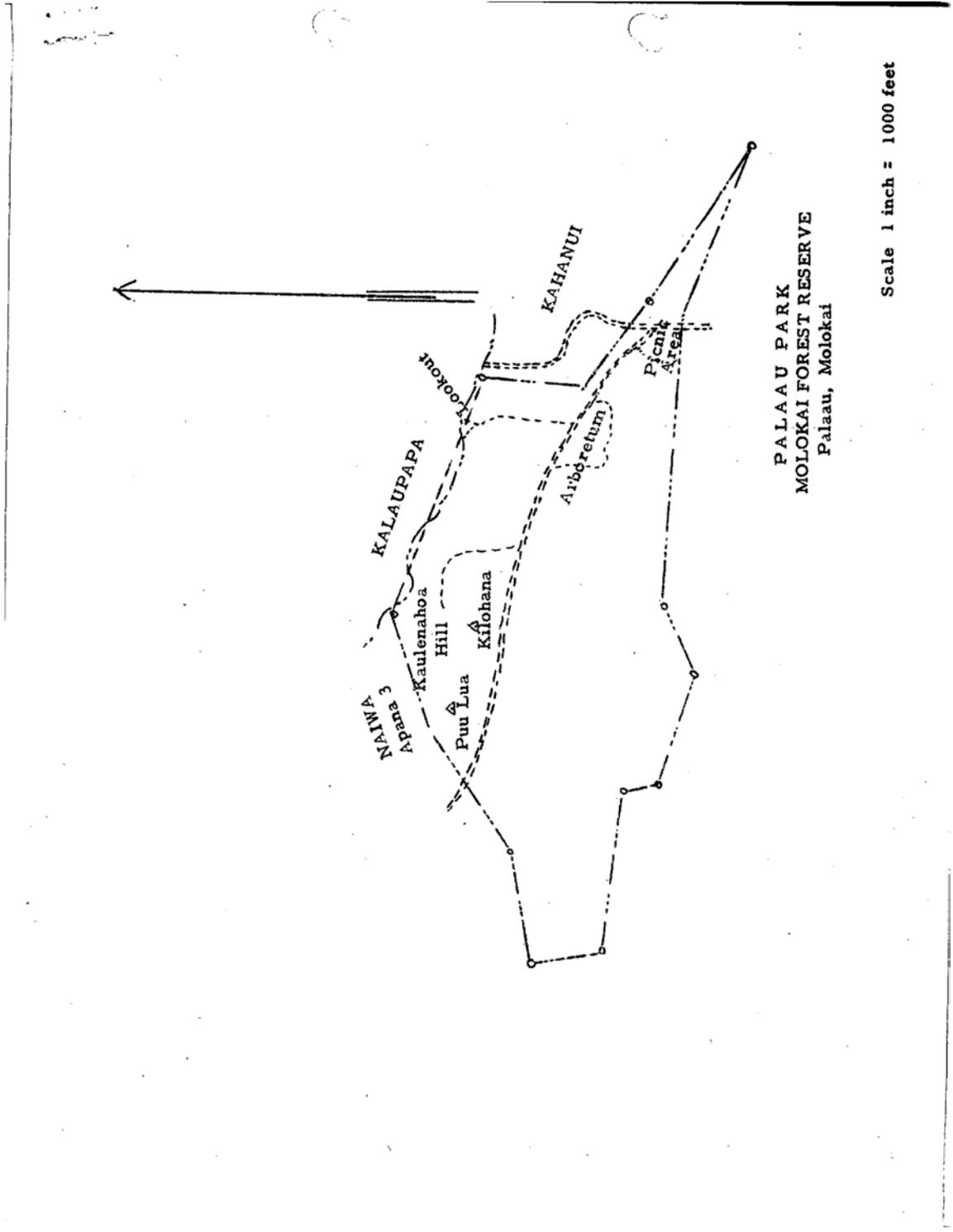
6. 252° 27' 1133.0 feet along the land of Naiwa to a pipe on edge of pali;
7. Thence following along the edge of the pali on the boundary between the land of Kalaupapa and Palaau to the boundary point between the lands of Kalaupapa, Palaau and Kahanui, the direct azimuth and distance being 291° 02' 30" 2264.6 feet;
8. 5° 17' 919.0 feet along the land of Kahanui to a pipe;
9. 307° 53' 964.0 feet along same to a pipe;
10. 302° 47' 1672.0 feet along same along gulch to a pipe;
11. 112° 08' 1635.0 feet along the land of Naiwa Apana 1 to a pipe;
12. 93° 09' 2606.0 feet along same to a ∇ on stone;
13. 64° 04' 683.0 feet along same along edge of gulch;
14. 107° 33' 1029.0 feet along same to the point of beginning

AREA 233.9 ACRES

Adopted this 29th day of June, 1955 at the meeting of the Board of Commissioners of Agriculture and Forestry.



J. L. DWIGHT, President
Board of Agriculture and Forestry



Appendix 6. Approval of DHHL License Agreement No. 215 by the Board of Land and Natural Resources for management of Pālā'au State Park, for five years from 1986 to 1991, dated 5-22-87

JOHN WAIHEE
GOVERNOR OF HAWAII



STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES
DIVISION OF LAND MANAGEMENT
P. O. BOX 521
HONOLULU, HAWAII 96809

DIVISIONS:
CONVEYANCES
FISH AND GAME
FORESTRY
LAND MANAGEMENT
STATE PARKS
WATER AND LAND DEVELOPMENT

May 22, 1987

Board of Land and
Natural Resources
State of Hawaii
Honolulu, HI

Gentlemen:

MOLOKAI

Subject: Request of Department of Hawaiian Home Lands to
Approve Palaau State Park Maintenance Agreement
(License Agreement No. 215), Palaau, Molokai

Palaau State Park situate at Palaau, Molokai is designed as Hawaiian Home Lands (DHHL). This park site covers approximately 233.68 acres and is shown outlined in red on map labeled Land Board Exhibit "A" appended to the basic file. The area has been used for park purposes since the mid 1950's.

This parcel plus various other DHHL properties formerly under the control and management of this department were returned to the DHHL by Governor's Executive Order No. 3270 dated December 27, 1984.

The DHHL has now asked our State Parks Division to continue with the operation and maintenance of Palaau State Park. This operation and maintenance agreement is covered by DHHL License Agreement No. 215 appended to the basic file and labelled Land Board Exhibit "B."

The term of the license is for five (5) years commencing retroactive from December 28, 1986. No rent will be charged by the DHHL nor will the DHHL be assessed a fee for the management services provided by this department. This arrangement is acceptable to the State Parks Division and is considered mutually beneficial to both agencies.

RECOMMENDATION:

That the Board approve of and authorize the execution of Hawaiian Home Lands License Agreement No. 215 covering the maintenance and operation of the Palaau State Park by the

FOR THE DIRECTOR
OF LAND MANAGEMENT

MAY 22 1987

ITEM F-8

Department of Land and Natural Resources, Division of State
Parks, Outdoor Recreation and Historic Sites subject to review
and approval by the Attorney General's office.

Respectfully submitted,



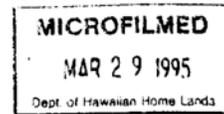
MIKE SHIMABUKURO
Acting Land Management Administrator, *js*

APPROVED FOR SUBMITTAL:



WILLIAM W. PATY, Chairperson

Appendix 7. DHHL License Agreement No. 336 to DLNR to manage Pālā'au State Park from December 28, 1991 through December 27, 2011, dated May 25, 1993



After Recordation Return By: Mail () Pickup () To:

Affects Tax Map Key:
Second Division, 5-2-13:06

LICENSE AGREEMENT NO. 336

In accordance with the provisions of Section 502-31, Hawaii Revised Statutes, this page is attached to that certain instrument:

Dated: 7/9/93

STATE OF HAWAII, DEPARTMENT OF HAWAIIAN HOME LANDS
License Agreement No. 336 to the STATE OF HAWAII,
DEPARTMENT OF LAND AND NATURAL RESOURCES

3791I

STATE OF HAWAII
DEPARTMENT OF HAWAIIAN HOME LANDS
LICENSE AGREEMENT NO. 336

THIS LICENSE made and issued this 9th day of July, 19 93, but effective as of December 28, 1991, by the State of Hawaii, DEPARTMENT OF HAWAIIAN HOME LANDS, whose place of business is 335 Merchant Street, Honolulu, Hawaii, and whose mailing address is P. O. Box 1879, Honolulu, Hawaii 96805, hereinafter called "LICENSOR," and the State of Hawaii, DEPARTMENT OF LAND AND NATURAL RESOURCES, whose mailing address is 1151 Punchbowl Street, Honolulu, Hawaii 96813, hereinafter called "LICENSEE."

WITNESSETH:

That the LICENSOR, pursuant to the authority granted to it by Section 207(c)(1)(A) of the Hawaiian Homes Commission Act, 1920, as amended (HHCA), is authorized to grant licenses for the use of Hawaiian home lands for public purposes.

WHEREAS, LICENSEE has requested a license to use Hawaiian home lands for a public purpose.

NOW THEREFORE, the LICENSOR, in consideration of the rent to be paid and of the terms, covenants and conditions herein contained on the part of the LICENSEE to be kept, observed and performed, hereby grants and conveys unto the LICENSEE, and its successors and assigns, an exclusive right and privilege to operate, maintain, and manage the premises for recreational and park purposes, containing approximately 233.68 acres and further identified by Tax Map Key No. 5-2-13:06 and situated at Palaau, Molokai, shown on Exhibit "A" attached hereto and incorporated herein by reference (the "easement area").

TO HAVE AND TO HOLD the same unto the LICENSEE, its successors and assigns, a term of twenty (20) years, commencing on December 28, 1991 and terminating on December 27, 2011, or until such time as the LICENSEE ceases to operate, maintain and manage the easement area. In the event operations cease for reasons beyond the LICENSEE'S control, such as fire or other casualty that renders the premises unusable, the LICENSEE shall have a reasonable period of time in which to resume operations before the license terminates.

3791I

AND THE LICENSEE hereby covenants with the LICENSOR, each for itself and not for the other, that:

1. RENT. The LICENSEE shall pay in advance to the LICENSOR the following annual rent, payable annually on or before December 28:

- A. The sum of NINE HUNDRED SEVENTY NINE AND NO/100 DOLLARS (\$979.00) per annum for the first ten (10) years;
- B. LICENSEE may pay a lump sum in advance for any fixed rental period with the net present value discounted at an annual rate of 4%.

2. REOPENING OF ANNUAL RENTAL. The net annual rental hereinabove reserved shall be reopened and redetermined at the expiration of the tenth (10th) year of the term.

3. DETERMINATION OF RENTAL UPON REOPENING OF THE ANNUAL RENTAL. The rental for each period to be reopened and redetermined shall be the fair market rental at the time of reopening. At least six (6) months prior to the time of reopening, the fair market rental shall be determined by an appraiser whose services shall be contracted for by the LICENSOR; provided, that should the LICENSEE fail to agree upon the fair market rental as determined by the LICENSOR's appraiser, the LICENSEE shall promptly appoint its own appraiser and give written notice thereof to the LICENSOR, and in case the LICENSEE shall fail to do so within ten (10) days after being advised of the fair market rental as determined by the LICENSOR's appraiser, the LICENSOR may apply to any person then sitting as judge of the Circuit Court of the judicial circuit in which the easement area is located for appointment of a second appraiser, and the two appraisers thus appointed in either manner shall appoint a third appraiser, and in case of their failure to do so within ten (10) days after appointment of the second appraiser, either party may have the third appraiser appointed by the judge and the fair market rental shall be determined by arbitration as provided in Chapter 658, Hawaii Revised Statutes. The decision of the appraisers or a majority of them shall be final, conclusive and binding upon both parties hereto. The appraisers so appointed shall deliver their determination before the sixtieth (60th) day following appointment of the third appraiser, and, in the event they shall fail to do so and the time for delivery of such determination shall not have been extended by mutual agreement of the LICENSOR and the LICENSEE, the employment of the appraisers shall immediately terminate and, except as may be approved by the LICENSOR and the LICENSEE in the exercise of their sole and absolute discretion with respect thereto, the

appraisers shall not be entitled to any payment for services or reimbursement of expenses incurred because of such appointment. In the event the employment of the appraisers shall be so terminated, new appraisers shall be appointed in the manner hereinbefore provided. The LICENSEE shall pay for its own appraiser, the LICENSOR shall pay for its appraiser, and the cost of the third appraiser shall be borne equally by the LICENSEE and the LICENSOR. Upon completion of the arbitration procedure, all appraisal reports shall become part of the public record of the LICENSOR. If the rental for any ensuing period has not been determined prior to the expiration of the preceding rental period, the Lessee shall continue to pay the rent effective for the previous rental period, but the LICENSEE shall, within thirty (30) days after the new rental has been so determined, make up the deficiency, if any.

4. WITHDRAWAL AND SURRENDER. The LICENSOR shall have the right to withdraw and the LICENSEE the right to surrender all or any portion of the premises. The right to withdraw or surrender shall be exercised only after a minimum one (1) year prior written notice is given to the LICENSOR or LICENSEE. The LICENSEE shall be entitled to remove its improvements, including the caretaker's quarters but shall not be entitled to any compensation for those improvements made by the LICENSEE on any portion of the premises withdrawn or surrendered. If only a portion of the premises is withdrawn or surrendered, the rental for the remaining portion will be reduced in proportion to the rental value of the premises withdrawn or surrendered.

5. SANITATION, ETC. That the LICENSEE shall keep the premises and improvements in a strictly clean, sanitary and orderly condition.

6. DUE CARE AND DILIGENCE. The LICENSEE shall use due care and diligence in the construction, operation, repair, renewal, maintenance and removal of the improvements and shall keep the improvements in good and safe condition and repair; should said improvements cause any damage or nuisance or waste or spoil the premises, the LICENSEE shall repair and restore the premises within a reasonable time thereafter.

7. CONDEMNATION. If at any time the easement area across which the License extends, or any part thereof, shall be condemned or taken for any public project by any governmental authority, the LICENSEE shall have the right to claim and recover from the condemning authority, but not from the LICENSOR, such compensation as is payable for the License and for the LICENSEE'S appliances and equipment, if any, used in connection with this License, which shall be payable to the LICENSEE as its interest appears.

8. ABANDONMENT. In the event the premises, hereby granted, shall be abandoned or shall remain unused for the purpose granted for a continuous period of one year, all rights granted hereunder shall terminate, and the LICENSEE will remove its improvements and restore the land as nearly as is reasonably possible to the condition existing immediately prior to the time of installation or construction of its improvements, if any, the LICENSOR hereby consenting and agreeing to such removal. Failure of the LICENSEE to remove its improvements and/or to restore the land within 180 days after notification to do same from the LICENSOR by certified mail at the LICENSEE'S last known address, will constitute a breach and the LICENSOR may remove the LICENSEE'S appliances, equipment and improvements and/or restore the land to a condition similar to that existing immediately prior to the time of installation and the LICENSEE will reimburse the LICENSOR for all reasonable costs in connection with the removal and/or restoration.

9. INCONVENIENCE TO THE STATE, COUNTY, ETC. That the LICENSEE, while in the exercise of any of the rights and privileges granted hereunder, shall not unduly or unreasonably inconvenience the LICENSOR, the County, or the licensees, or permittees, or lessees of the LICENSOR, if any, in the use of the land crossed by or adjoining the premises.

10. IMPROVEMENTS. That the LICENSEE, prior to the construction of any additions, alterations or improvements, shall submit plans and specifications therefor to the Chairman for his review and approval. All construction shall be accomplished in accordance with standard engineering practices.

11. MAINTENANCE AND REPAIR OF EASEMENT AREA. The LICENSEE shall maintain the premises in good condition at all times, to the satisfaction of the LICENSOR or any other authority having jurisdiction over the premises, and shall promptly make all repairs thereto which may be necessary for the preservation of the condition of the premises.

12. RELOCATION. If the LICENSOR shall determine that the continued exercise of the premises rights granted constitutes an undue interference with a subdivision or development of the land over which the granted easement crosses, the LICENSOR shall have the right to terminate the License granted to the extent necessary to eliminate such interference.

13. BREACH. If the LICENSEE shall fail to observe or perform any of the terms, covenants and conditions herein contained, and on its part to be observed and performed, the LICENSOR shall deliver written notice of the breach or default by service as provided by section 634-35 or 634-36, Hawaii

Revised Statutes, or by registered mail or certified mail to the LICENSEE at its last known address, making demand upon the LICENSEE to cure or remedy the breach or default within sixty (60) days from the date of receipt of the notice. Upon failure of the LICENSEE to cure or remedy the breach or default within the time period provided herein or with such additional period as the LICENSOR may allow for good cause, the LICENSOR may terminate this License without prejudice to any other remedy or right of action.

14. RIGHT TO ENTER. The LICENSOR or the County, and the agents or representatives thereof, shall have the right to enter and cross any portion of the demised premises for the purpose of performing any public or official duties, provided, that in the exercise of such rights, the LICENSOR or the County shall not unreasonably interfere with the LICENSEE or LICENSEE'S use and enjoyment of the premises.

15. TERMINATION. That at the end of or earlier termination of this License, the LICENSEE shall, peaceably deliver unto the LICENSOR possession of the premises. Furthermore, upon the expiration, termination, and/or revocation of this License, should the LICENSEE fail to remove any or all of the LICENSEE'S personal property from the premises, after notice thereof, the LICENSOR may remove any and all personal property from the premises and either deem the property abandoned and dispose of the property or place the property in storage at the cost and expense of the LICENSEE, and the LICENSEE does agree to pay all costs and expenses for disposal, removal, or storage of the personal property.

16. EXTENSION OF TIME. That notwithstanding any provision contained herein to the contrary, wherever applicable, the LICENSOR may for good cause shown, allow additional time beyond the time or times specified herein to the LICENSEE, in which to comply, observe and perform any of the terms, covenants and conditions contained herein.

17. SEVERABILITY. Whenever possible, each provision of this License shall be interpreted in such manner as to be effective and valid under applicable law, but if any provision of this License should be prohibited, or invalid under applicable law, such provision shall be ineffective to the extent of such prohibition or invalidity without invalidating the remaining provisions of this License.

18. SINGULAR/PLURAL. The singular or plural depends on its appropriate use.

19. SPECIAL CONDITIONS.

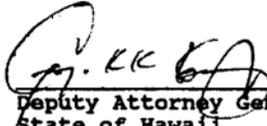
- a. LICENSOR reserves any and all rights to economic development and revenue-producing uses and activities on the premises.
- b. LICENSOR reserves up to four (4) parking stalls to allow native Hawaiian concession operations.
- c. The LICENSOR reserves the right to have the LICENSEE remove certain or all improvements upon the withdrawal, surrender, expiration or revocation of this agreement and restore the lands to a condition existing prior to the time of the establishment of the Palau State Park.
- d. LICENSEE to submit an inventory of existing structures and improvements and a long range plan for the development and management of the premises.
- e. LICENSEE to submit final construction plans of any proposed improvements for the LICENSOR's review and approval.
- f. LICENSEE, shall indemnify, defend, and hold LICENSOR harmless from any damages and claims resulting from the release of hazardous materials, including contamination from underground tanks on the premises, occurring while the LICENSEE was in possession of the premises since 1930 to the expiration, surrender, termination or withdrawal of the easement area.

20. AGREEMENT. This agreement shall be binding upon and inure to the benefit of the parties hereto and their respective legal successors and assigns.

IN WITNESS WHEREOF, the parties hereto have caused these presents to be duly executed the day and year first above written.

Approved by the Hawaiian
Homes Commission on
May 25, 1993

APPROVED AS TO FORM
AND LEGALITY:


Deputy Attorney General
State of Hawaii

APPROVED AS TO FORM:


Deputy Attorney General
State of Hawaii

Approved by the Board of
Land and Natural Resources
at its meeting held on

7/9/93

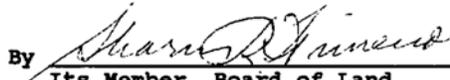
State of Hawaii
DEPARTMENT OF HAWAIIAN HOME LANDS

By 
Healyku L. Drake, Chairman
Hawaiian Homes Commission

LICENSOR

State of Hawaii
DEPARTMENT OF LAND AND NATURAL
RESOURCES

By 
John P. Keppeler
Its Chairperson and Member
Board of Land and Natural
Resources

By 
Sharon R. Finney
Its Member, Board of Land
and Natural Resources

LICENSEE

Appendix 8. Letters of Correspondence from Department of Forestry files regarding management of Pālā'au 3 as part of the Molokai Forest Reserve and the type of trees planted, 1936 - 1952



TERRITORY OF HAWAII

FILE

COPY

Board of Commissioners of Agriculture and Forestry

Honolulu

May 18, 1936.

Board of Commissioners of
Agriculture and Forestry
Honolulu, Hawaii.

Molokai Forest Reserve
Palaau 3

Gentlemen:

The government land of Palaau 3 within the Molokai Forest Reserve consists of 230 acres of potential forest land at the top of the general Molokai pali west of the Kalaupapa peninsula. It consists of rolling land at the general elevation of 1600 feet, cut up by shallow gulches in the bottoms of which are remnants of the original native forest which at one time covered the whole area.

The land is much exposed to the strong trade winds and is in the cloud belt. The gulches run with water in the rainy season and springs of water exist along the southern boundary of the land.

The original forest has been generally denuded by continuous grazing for several generations but since March 1930, the land has been protected by proper fencing, all stock has been kept out, and the vegetative cover is coming back.

This land came under the control of the Hawaiian Homes Commission by act of Congress and it was upon the initiative of the above Commission that Palaau 3 was classed as forest land not subject to leasing for grazing purposes.

That Commission dedicated this land for forest purposes by a motion unanimously passed on July 19, 1928, "it being the desire of the Hawaiian Homes Commission to set aside and reserve the lands of Palaau No. 3 for the purpose of reforestation by the Board of Agriculture and Forestry."

In Opinion No. 1517, of the Attorney General of Hawaii, dated December 28, 1928, in which it was stated that the land must first be returned to the control of the Commissioner of Public Lands before it could be set aside as a forest reserve, it was brought out "that forest growth is a well recognized aid to the protection and conservation of water which is one of the prime necessities in the case of persons who will secure leases of Hawaiian home lands xxx the Hawaiian Homes Commission is authorized to use any government owned water for the purposes of said Act; so that,

in setting aside Hawaiian home lands as forest reserves, the government will really be aiding and furthering the purposes of the Hawaiian Homes Commission Act."

This opinion also states: "However, it is believed that the Hawaiian Homes Commission would not lightly disregard the benefits of forestation of its waste lands and recall the same to its control except for very strong and cogent reasons, which would not arise for many years to come, if at all, so that as a practical matter such setting aside would seem unobjectionable."

Following the procedure prescribed by the Attorney General's opinion, the Hawaiian Homes Commission on August 15, 1929, passed Resolution No. 9, returned Palaau 3 to the jurisdiction of the Commissioner of Public Lands.

On March 25, 1930, by proclamation of the Governor, this land was included along with other lands, as shown on the attached map, as an addition to the existing Molokai Forest Reserve.

As soon as funds were available and the area was properly fenced this Board began the reforestation of the land and planted the following numbers of trees:

1931	3,497
1932	3,435
1933	5,150
	<u>17,062 on 40 acres</u>

On July 1933 this planting work had to cease because of failure of the Legislature to appropriate funds.

A nursery has recently been started on Molokai as an Emergency Conservation Work project. As soon as the trees at that nursery are of suitable size, it is planned to resume the reforestation of Palaau 3, and this work should be concluded by the end of the present calendar year.

Very truly yours,

E. S. Judd

Territorial Forester

*1 copy to G.P. Cooke
to " " Board*

Lands - Molokai
Molokai Reserve
Palasau



TERRITORY OF HAWAII
BOARD OF COMMISSIONERS
OF AGRICULTURE AND FORESTRY
HONOLULU 1

July 20, 1951

Mr. Flavious Peter
Forest Ranger
Kaunakakai, Molokai

Dear Flavious:

I have a letter from Mrs. Cooke asking if we can give some assistance to the Sites Committee on Molokai in cleaning the area around the "Sandalwood lua" at Waikolu Valley. She has offered to supply one of her men to help in this clearing. I wish you would contact her and take your crew to the area and make a good job of clearing it up, as this work is in line with our recreation program.

I would also like to ask you to clear a good trail to the Phyletic rocks in the Palasau Forest Reserve. The brush and trees around the rocks should be also cleared back for about 25 feet on all sides. This is definitely a tourist attraction which should be capitalized on. Is there any need to keep a lock on the gate to this area? If so, I would recommend that an entrance be made adjacent to the gate which would permit people to enter but not cattle. This can be done by placing a post about 24 inches from the gate post and then sinking 2 fence posts opposite the opening which would be also about 24 inches from the gate post and the new post. The attached sketch gives a better idea of what I have in mind. If you can finish this job before the end of next week I know there will be a big party on Molokai that may make use of the trail.

Yours very truly,

COLIN G. LENNOX, President
Board of Agriculture and Forestry

COL/r
Attach.

cc: Mr. Crosby
Mrs. Cooke

Land - Molokai
Palau Park.



TERRITORY OF HAWAII
BOARD OF COMMISSIONERS
OF AGRICULTURE AND FORESTRY

HONOLULU 1

January 23, 1952

Mr. Flavius Peter
Forest Ranger
P. O. Bx 82
Kaunakakai, Molokai

Dear Flavius:

I am attaching two copies of the Work Plan for Palau Park, as well as copies of the master map on this park. I think this work plan is self-explanatory and you will have no difficulty in understanding it.

I am also ordering five gallons of "Weedon Brush Killer 64" for shipment to you. This is to be used on killing the guava and ironwood along the forest road. I am attaching herewith a set of instructions on its use.

I made a few notes during our stay at the CCC camp on improvements that we should make. I will list these as follows:

1. Place a fire extinguisher in the building (if you do not have one please advise so that a spare can be sent from here).
2. Put clothes hooks around for convenience.
3. Cut the brush away from the building and do a job of general policing of the ground surrounding the building such as removing old lumber, cans, etc.
4. Place a rubbish can inside the building and another one at the steps entering.
5. Remove the rusty screens from around the building. They do not look well now.
6. I am asking that a new chimney be sent for the fireplace as well as mason jars. These are to come from Oahu.

Yours very truly,

COLIN G. LENNOX, President
Board of Agriculture and Forestry

CGL/r
Attachs.

cc: Mr. Crosby ✓

WORK PLAN - PAALAU PARK, MOLOKAI

NOTE: The outline of jobs listed below for the development of the Paalau Park supplements the master plan, a copy of which is attached herewith. Next to each job appears a month (i.e. January). An attempt should be made to complete the job within the month so indicated.

I. TURN AROUND AREA

1. (January) - remove large roots on driveway part of turn around, smooth dirt surface and plant to kukuyo grass.
2. (January) - dig beds for shell ginger (see map), fertilize with chicken manure, plant shell ginger and place guard logs around beds to protect from autos.

II. PICNIC AREA - CLEANING AND PLANTING

1. (February) - remove guava and trees in driveway and on picnic area, toilet area, as shown on map, and pile guava and tree branches along the makai and Kaunakakai boundaries.
2. (February) - smooth ground surface in picnic area and plant to kukuyo.
3. (February) - smooth driveway and parking area and plant to kukuyo.
4. (February) - plant shell ginger and philodendrons sp. in beds as indicated on map. Advise Honolulu when ready for planting material of philodendron so that this can be sent from Oahu.
5. (February) - plant hedge of Monterey Cypress outside fence and along forest road as shown on map. Space 4' apart. Advise if trees are not available.
6. (February) - plant Paper Bark trees in area shown on map at spacing of 4'. Advise if trees are not available now.
7. (February) - cut trees on small picnic area so that parking will be possible off from forest road. Plant this picnic area to kukuyo grass.

III. FOREST ROAD AND TRAIL TO PHALIC ROCKS

1. (February) - cut out low over-hanging branches along roadway.
2. (February and April) - Spray volunteer guava and ironwood along forest road with 2,4-D solution. Use Molokai Ranch spray rig.

Follow directions sent from Honolulu with spray material.

3. (July) - widen and grade trail to Phallic Rocks.
4. (February) - cut ironwoods at Phallic Rocks so as to give good view.

IV. CONSTRUCTION OF PARK FACILITIES

1. (February) - cut and bark Eucalyptus robusta trees of about 8 to 10" diameter and 20' lengths for guard fence around picnic area. Stack these poles for drying.
2. (July) - dig holes for guard fence and set 3' Cedar ties with 2' below ground and 1' above ground. Then fasten E. robusta poles to fence. Paint poles with creosote three quarters plus kerosene one quarter after set in place. Put strip of heavy roofing paper between E. robusta log and Cedar post to reduce rotting.
3. (July) - build gates No. 2 and No. 3. See attached photo for gate design.
4. (July) - dig toilet pit, line with stone and lay reinforced concrete slab over top with entrance hole. See plans to be submitted at later date for toilet dimensions.
5. (August) - lay logs on mauka side of drive and along sides of parking area as shown on map.
6. (August) - build toilet building according to plans.
7. (February) - grade entrance to park and excavate for cattle guard then close fence. Plant this area with kukuyo grass after grading and excavation complete.
8. (July) - build concrete sides and install cattle guard but keep fence closed over cattle guard until final opening of park later in year.

V. INSTALLATION OF SIGNS AND PICNIC BENCHES

The picnic benches and signs will be prepared on Oahu and shipped to Molokai ready for assembling. This assembling work of picnic benches, building of grills, placement of signs and rubbish cans, to take place in September. The park will be opened after this date if the grass and other vegetation have grown sufficiently well to permit traffic.

The public will not be given free access to this area during the period of construction. The forest reserve gate should be kept locked and only entry permitted as has been in the past when the area was under forest reserve management.

cc: Mr. Crosby
Flavious Peter (2 copies)

WEED KILLER FOR YOUNG GUAVA AND IRONWOOD

For use on young guava foliage which has developed from cut stumps and ironwood and other brush growth of this nature:

MIXTURE

4 quarts Weedone Brush Killer No. 64
4 gallons diesel oil
95 gallons water

Use a spray rig with a low pressure.

Wet foliage and stems to the ground line.

CAUTION

Do not mix or open cans of Weedone Brush Killer No. 64 in nursery or places where there are young trees or sensitive plants.

Never turn sprays upward when using for fear of causing mist to rise onto desirable foliage.

Clean spraying rig away from nursery plants as the fumes may be dangerous to them.

TERRITORY OF HAWAII
BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY
HONOLULU

January 23, 1952

MEMORANDUM

TO: MR. CROSBY
Territorial Forester

RE: MOLOKAI FORESTRY WORK - (Notes following inspection by
C. G. Lennox, January 15-16, 1952).

1. Cattle in Forest Reserve

There are unbranded cattle in the Molokai Forest Reserve in the lands of Kalamaula. They are supposedly Meyers cattle. Peter has repeatedly asked them to get them out and he says although they claim to look for them he keeps finding them there. The fence is in good shape. Possibly, this area should be advertised and declared in accordance with Territorial Law.

2. Pāā'au Forest Reserve

There are six head of Molokai Ranch cattle in this reserve and have been there for four months or over. Two of them are blooded bulls. Fitzgerald and Peter have spent considerable time trying to catch them and the ranch is now trying to coax them out with feed. It is believed that these cattle gained entrance through the gates used by CPC in getting to their pineapple field. This has been a subject of considerable trouble for many years. Employees of CPC are not responsible when it comes to keeping the gates locked. I therefore had a meeting with Mr. Hoāxy, Manager of CPC, and issued an ultimatum that we would have to put on a forestry lock on this gate which would prohibit the entrance of any person to the forest reserve who did not have a key. I made two suggestions: (1) that they (at CPC expense) fence out the road so that their trucks do not have to go through a vital gate entering the forest reserve, or, (2) bulldoze a road outside of the forest reserve along the gulch side to their pineapple field. Hoāxy and Peter were to inspect this area on the following day and reach a decision as to which course to follow.

RE: MOLOKAI NURSERY

Last August when you and I inspected work on this island it was agreed with Fitzgerald that we could establish a nursery near the watertender's house above the CCC camp which I will refer to in the future as "mauka nursery". It was my understanding that as soon as this area was ready all of the trees for mauka plantings

would be moved to this area. The pipeline and overhead irrigation sprinkler system has been installed but so far only 2,000 Western Red Cedars have been heeled in. There are still many thousands of seedlings in flats at Kaunakakai that need watering and consumed man-days of attention. The cost of maintaining the nursery on Molokai for the past fiscal years are: 1948 - \$2510, 1949 - \$1750, 1950 - \$1859. Although these costs are not high in reference to other forest nurseries they do not reflect the full amount of lost effort on Molokai because when men are assigned to this work it cripples the small gang for field work.

It was Peter's recommendation that we germinate tree seedlings on Maui for forest planting and moved ~~into~~ Molokai when they are 3 or 4" high in the thinned out flats. Also, that ornamentals and fruit trees not carried in stock on Molokai could be taken on order and obtained from Maui and Oahu. Also, that the nursery be closed on Saturdays because of the small amount of demand.

It is my recommendation that he discard all pot bound seedlings, plant the hala which he has in cans around the orchard area and adjacent thereto; move all flats of forest trees which are destined for mauka plantings to the mauka nursery and retain only those which will be used in makai plantings where the truck approaches the planting area from the lowlands. I also suggested that he keep a small stock of ornamentals (5 to 7 or each at Kaunakakai and a reserve stock at the mauka nursery). The amount of each will depend upon his present demand.

I did not suggest it but I have since thought that the large number of ti plants which he has in cans could be used to plant to the windward side of the mauka nursery as a low windbreak. They will also offer planting material in the future. These are all seedling colored tis.

If the procedure of taking orders and obtaining plants from Maui and Oahu is followed then Peter should have available an inventory list of plants at those nurseries.

RE: TREE PLANTING 1951-1952

1. The number of trees available in flats for planting this season far exceeds the capacity of the present gang to plant them ~~in~~ for the techniques they are using. I therefore recommend that two temporary laborers be hired for two months and that the mechanical post-hole digger be assigned to Peter. This would make a five man crew which could dig holes and plant simultaneously. I would recommend that Landgraf spend a day or two at the start of this project to see

that they are well organized.

2. In order to utilize time and labor efficiently I would recommend that planting be confined to ridges where roads are now available and leave the more costly planting in gulch sides and bottoms to a later date. For the lower regions of the dry ridges there are 4,000 Silk Oak available which we recommended planting in two rows around the edges of the gulch and 1800 Formosan Koa which could go on the windswept scars at close planting.

3. The Meyer land recently purchased as a forest reserve easement should be planted and this can accommodate the balance of the trees ready for setting out this spring. I recommended that they put in the following in this area: Chinese Fir 1,000, Western Red Cedar 2,000, Brushbox 4,000, Norfolk Island Pine 2,000, and a few hundred Osage-orange.

Low ridges + Gulch slopes where pockets of good soil remain. Much land mostly too wet.

RE: TREE PLANTING PLANS FOR 1952-1953

I recommended that Peter start cuttings of 4,000 P. radiata for next year's planting. I suggested 1,000 be put in the "mauka nursery" and the balance be put in the beds where he had success last year. I would like a clarification from you as to whether this is radiata or some other pine? Can you trace the history on how he obtained his original planting material?

A list of trees for planting on the Molokai watershed should be prepared now, seed assembled and plans laid to get them in flats during March. The total number for next year's planting will depend somewhat on how fast planting can proceed with the new planting technique described above.

Appendix 9. Letter regarding management of Pālā'au State Park, 1962

April 4, 1962

Mr. Leroy Mollena
P. O. Box 617
Kaunakakai, Molokai

Dear Mr. Mollena:

In reading your State Park Weekly Activity Report, I find that you have finished dressing up the restroom at the park. I am most certain that this will meet with favorable reaction by the public as you will know that one of the first impression that anyone has when they see a restroom in clean and sanitary condition is that of good maintenance.

The next thing that enters my mind while on the subject of maintenance is the shelter in the arboretum area. This shelter is in need of painting. The roof should be stained (green) and the uprights supporting the roof painted brown.

I hope the use of the Forestry truck has made it possible for you to get the mowing done at the arboretum and park area in general. I am sure once the grass has been cut, the mowing problem will lessen. I am sure, also, that if you keep the grass down at the arboretum, it will entice people to use this area for picnicking, etc., which is our aim at all times.

I would appreciate it very much if you will contact Mr. Peter, the Forester on Molokai, ask him if he has any map showing where all the trees in the arboretum are planted, their names or whatever he has in relation to the arboretum. This will simplify the relabeling of those that have been lost or had their labels removed. This may even indicate the type of trees that could be made available from our Forestry nursery for the replacement of those that have died or have been pulled out. If he has anything that will be of help to us in one way or the other to identify the plants, please ask him to forward the information to this office so we can make additional copies and then return his copies if he needs them. Also, will you get information from Mr. Peter

Mr. Leroy Mollena

-2-

April 4, 1962

regarding the water system. Mr. Dunlap would like to find out if we own this system, who pays the electric bill for the pump - Forestry or what agency, type and serial number of the pump, number of footage of pipeline and the size of the water main and any other information you can get that is connected with the water system.

The need for information to another Phallic Rock that is in the park is also requested as we have been asked at different times for information regarding the second Phallic Rock. This information will be of great help to this office in that in the future when a brochure is made, we will have all the information we need.

Anyway, the request for attention to the work needed and for information requested will be greatly appreciated.

Very truly yours,

J. M. SOUZA, Jr., Supervisor
Maintenance & Operations

Appendix 10. Field Report with photos of Molokai Reforestation and Pālā'au Park
1938 - 1953

To: Mr. William Crosby, Territorial Forester

TERRITORY OF HAWAII
BOARD OF COMMISSIONERS OF AGRICULTURE AND FORESTRY
DIVISION OF FORESTRY
HONOLULU

Molokai Reforestation and Pālāau Park

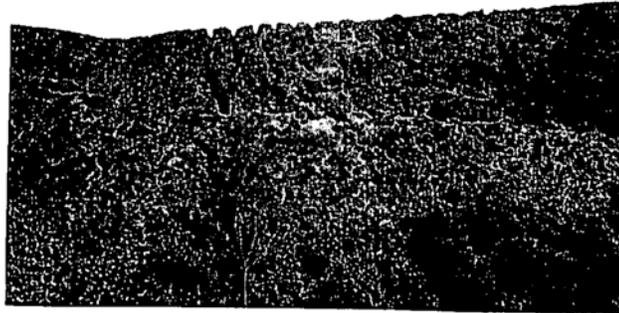


Fig. 1 - Palaaau - 1938 Photo by Assoc. Forester L. W. Bryan

1,665 ft. elevation CCC tree planting. Type of cover shrub guava, lantana and akia.



Fig. 2 - Kalamaula - Kahanui, 1938 Photo by Assoc. Forester L. W. Bryan

2,280 ft. elevation. Forest boundary fence adjoining the Kahanui-Kalamaula lands. Forest area planted by CCC years 1938-39. Type of cover: lantana, guava, paumakani, naupaka, akia and pilo.

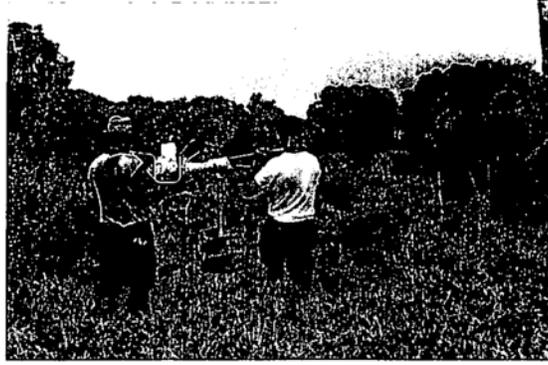


Fig. 3 - Kamiloloa-Kahanui (Apana 3) Feb. 15, 1952
Photo by Assoc. Forester M. F. Landgraf

3,370 ft. elevation on slope of Puu Kao, adjoining truck trail leading to Kahanui (Apana 3); tree planting by special planting crew and Forestry men using McCulloch post hole digger. Native flora consists of small Lehua, pilo, Ohia ha, paumakani, Ohelo, Akia, Kopiko and Alahee.

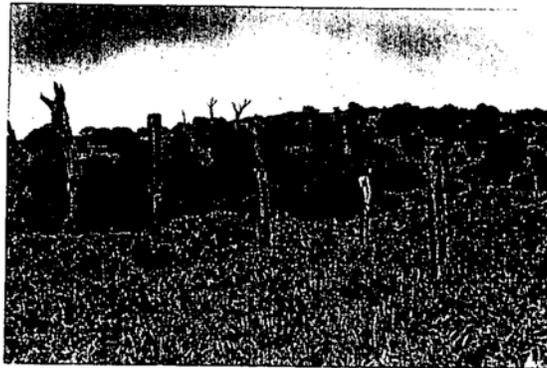


Fig. 4 - Kamiloloa-Kahanui (Apana 3) 2-15-52
Photo by Assoc. Forester M. F. Landgraf

3,370 ft. elevation on slope of Puu Kao. Tree planting started during the month by special labor and Forestry men. Native flora consists of small Lehua, Pilo, Ohia ha, paumakani, Ohelo, Akia, Kopiko and Alahee.



Fig. 5 - Kahanui (Apana 3) Feb. 15, 1952
Photo by Assoc. Forester M. F. Landgraf

3,350 ft. elevation knoll on mauka section of Kahanui. Picture taken from Kamiloloa-Kahanui boundary. Area planted with trees during the month of February and March 1952 by special labor and Forestry men. Native flora consists of small Lehua, Pilo, Ohia ha, Paumakani, Ohelo, Akia, Kopiko, and Alahee.



Fig. 6 - Makakupaia - January 17, 1952
Photo by Assoc. Forester M. F. Landgraf

Picture taken from forest gate on Kawela ridge on Ooa (red hill) showing boundary fence and area in need of reforestation. On February 12, 1952 silk oak trees were planted on Kawela ridge on foreground of picture by special laborers and Forestry men. Native flora consists of Puu Keawe, Akia, Kokoolau, Alahee, Naupaka, and few Pua and Wiliwili trees in gulches.



Fig. 7 - Kahanui (Apana 3) Plateau, Feb. 15, 1952
Photo by Assoc. Forester M. F. Landgraf

3,100 ft. elevation. Waihanau Stream on left side of picture. Planted by special laborers and Forestry men during the year 1952. Native flora consists of small Lehua, Ohia ha, Puu Keawe, Kopiko, Ohelo, Pilo, Paumakani, and Naupaka.



Fig. 8 - Kahanui (Apana 3) Plateau - February 15, 1952
Photo by Assoc. Forester M. F. Landgraf

Background Waialeia stream on left is branch of Waihanau stream, elevation 3,100 ft.; area planted during years 1952-53 by special laborers and Forestry men. Native flora consists of small Lehua, Ohia ha, Puu Keawe, Kopiko, Ohelo, Pilo, Paumakani, and Naupaka.



Fig. 9 - Kapaakea - January 17, 1952
Photo by Assoc. Forester M. F. Landgraf

1,981 ft. elevation. First *Pinus radiata* planting on lower section of Kapaakea ridge adjoining the forest boundary fence planted April 1949 by Ranger F. Peter and Forestry men. Right background, Eucalyptus grove.



Fig. 10 - Palaau Park - January 15, 1952
Photo by Assoc. Forester M. F. Landgraf

1,600 ft. elevation. Area cleared of trees, graded and ready for grass planting and construction work.



Fig. 13 - Kawela - Makakupaia, March 23, 1953
Photo by Assoc. Forester M. F. Landgraf

2,902 ft. elevation at road junction. Taken from Puu Kupaia. Stream on left is a branch of the east fork Kawela gulch; the right, Onini gulch. Native covers: Akia, Naupaka, Ulei, Puu Keawe, Aalii, Kokoolau and Alahee. In gulches and steep slopes Heau, Halapepe, Wiliwili and Pilo.



Fig. 14 - Makakupaia - Kawela, 3-23-53
Photo by Assoc. Forester M. F. Landgraf

2,610 ft. elevation Puu Ooa (red hill) from where picture was taken. Background is Puu Kupaia; center, Onini gulch. Native flora consists of Akia, Naupaka, Ulei, Puu Keawe, Aalii, Kokoolau and Alahee.

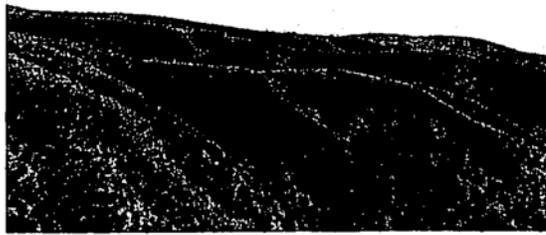


Fig. 15 - Makakupaia - March 23, 1953
Photo by Assoc. Forester M. F. Landgraf

2,650 ft. elevation. Gulch south fork Kaunakakai, Hill on lower background Puu Ooa (red hill) picture taken from spur at end of road on land of Kamiloloa. Native flora: Akia, naupaka, Ulei, Puu Keawe, Aalii, Kokoolau and Alahee.

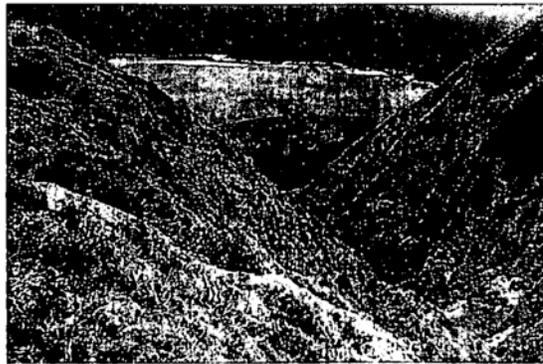


Fig. 16 - Waihanau Stream - March 23, 1953
Photo by Assoc. Forester M. F. Landgraf

2,385 feet elevation Puu Kauwa where picture was taken from with background of Kalaupapa and Kauhako Crater. Goats inhabit this area. Native flora consists of small Lehua, pilo, naupaka, Akia, Alahee, paumakani and in gulches Kukui.



Molokai Reforestation Inspection on Dec. 31, 1953
From left to right: Governor Samuel W. King, newspaper reporter and
Mr. J. L. Dwight, Pres. of Bd. of Agr. & Forestry



From left to right:
Mr. Charles Silva, Director, Dept. of Institutions
Governor Samuel W. King
Mr. J. L. Dwight
Mr. Flavius, Forest Ranger (back of Mr. Dwight)



From left to right:
Mr. J. L. Dwight
Mr. Charles Silva
Governor Samuel W. King
Mr. Flavious Peter

FOREWORD

Best Management Practices (BMPs) are effective, practical, structural or nonstructural methods which prevent or reduce the movement of sediment, nutrients, pesticides and other pollutants from the land to surface or ground water, or which otherwise protect water quality from potential adverse effects of silvicultural activities. These practices are developed to achieve a balance between water quality protection and the production of wood crops within natural and economic limitations.

A thorough understanding of BMPs and the flexibility in their application are of vital importance in selecting BMPs which offer site specific control of potential nonpoint source pollution. With each situation encountered at various sites, there may be more than one correct BMP for reducing or controlling potential nonpoint source pollution. Care must also be taken to select BMPs that are practical and economical while maintaining both water quality and the productivity of forest land.

The Federal Water Pollution Control Act Amendments of 1972, Public Law 92-500 (and as amended by Sec. 319, 1986), require the management of nonpoint sources of water pollution from sources including forest-related activities. BMPs have been developed to guide forest landowners, other land managers and timber harvesters toward voluntary compliance with this act. Maintenance of water quality to provide "fishable" and "swimmable" waters is central to this law's objectives. The Environmental Protection Agency (EPA) recognizes the use of BMPs as an acceptable method of reducing nonpoint source pollution.

Nonpoint source is diffuse pollution that comes from almost everywhere; it even occurs naturally to a certain extent. The amount of pollutants from any particular spot is small and insignificant, but when combined from over the landscape, can create water quality problems. Although it is unrealistic to expect that all nonpoint source pollution can be eliminated, BMPs can be used to minimize the impact of forestry practices on water quality. These practices must be reasonable, achievable and cost effective. The adoption and use of BMPs will provide the mechanism for attaining the following water quality goals:

- to maintain the integrity of stream courses;
- to reduce the volume of surface runoff originating from an area of forest management disturbance and running directly into surface water;
- to minimize the movement of pollutants i.e. pesticides, nutrients, petroleum products, etc. and sediment to surface and ground water;
- to stabilize exposed mineral soil areas through natural or artificial revegetation means.

The intent of this guide is to promote better stewardship of the forest resources. This guide delineates environmentally responsible land management methods which, when applied properly, minimizes adverse impacts on the forest ecosystem and maximizes landowner objectives. Unusual situations may arise or pollution control measures other than those recommended here may be found. In these cases, common sense is most often the best guide.

Information presented in this guide is not to be used as the basis for setting water quality standards or as the basis of required use of watershed protection practices. Compliance with any watershed protection practices would be on a voluntary basis backed up with a public water quality education and awareness program. Changing of water quality standards or the required use of protection practices should not be attempted without careful study of the beneficial effects gained from modifying existing silvicultural practices now in use.

INTRODUCTION

The Division of Forestry and Wildlife (DOFAW) is mandated by HRS, Chapter 183 to "...devise ways and means of protecting, extending, increasing, and utilizing the forests and forest reserves, more particularly for protecting and developing the springs, streams, and sources of water supply to increase and make that water supply available for use..."

The number one resource that is generated by the forest is water. Since the establishment of the Department of Agriculture and Forestry in 1900, the concern for the protection of forest lands for the purpose of water has been a high priority. Fencing to keep out wild cattle and other feral animals and reforestation efforts to re-establish watersheds have been the key to the continuance of the production of high quality water.

In 1961, Hawaii created, by law, the nation's first statewide zoning districts, and

today approximately 95% of the Hawaii's four million acres are zoned for agricultural or conservation uses. The Conservation district, which is under the jurisdiction of the Department of Land and Natural Resources (DLNR), encompasses almost one-half of the State, of which one million acres is state-owned. The majority of Conservation lands are covered by forests, but also contain grasslands, coastlines, cliffs, offshore islets, and wetlands. Vegetative communities include lowland and montane rainforests and unique examples of tropical biodiversity, much of it endangered.

The Division of Forestry and Wildlife recognizes the need for responsible stewardship of the natural resources, which include soil and water. The success of BMPs to protect water quality within Hawaii depends on mutual cooperation and trust among landowners, industry, environmentalists, wood producers, regulatory agencies, governmental officials, and the general public. All have an interest in good land management as it relates to water quality.

THE FOREST/WATER RELATIONSHIP

The forest and water resources are mutually dependent upon one another. Forests depend on water, namely rain, surface water, and groundwater for their growth and reproduction. Major long-term changes in the water supply can cause permanent changes in the content, quality and vitality of forest lands.

On the other hand, surface and groundwater quantity and quality are largely influenced by the surface on which rain falls and through which it percolates. The tremendous filtering capacity of forest lands provide effective and high quality groundwater recharge.

Hawaii's streams and aquifers all benefit from the presence of forests. In addition to these water quality benefits, forests provide needed wood and fiber products, wildlife habitat, aquatic resources and habitat, recreation values and aesthetic benefits. It is in managing forests for these benefits that damage to the water resource can result. Following is a brief discussion of the most commonly used forest management practices and the impacts they can have on the quality of the water resource.

Timber Harvesting

The removal of trees from a site has little impact on water quality, as long as the trees do not provide vital shade to streams and as long as the slope of the land is

not excessive. The natural warmth of many streams can be exaggerated by removing shading vegetation from their banks. Increased water temperature promotes lower dissolved oxygen levels, placing stress on fish and other aquatic organisms.

Removing timber per se does not directly cause significant water quality changes, since ground cover is not excessively disturbed during proper logging operations. On steep slopes, however, careless timber removal can increase the likelihood of runoff and soil loss. This may lead to water quality degradation as well as a loss of site productivity. Steep areas should therefore be logged carefully using proper harvesting techniques for the sake of both water quality protection and site protection.

Road Construction and Drainage Techniques

All facets and phases of a sound forest management program rely heavily on accessibility to the forest. Consequently, temporary and permanent access roads are necessary components of all management programs. They are also one of the most costly investments made in a forests.

Temporary access roads are constructed to facilitate harvesting operations, site preparation and planting and often abandoned after the new stand is established. When abandoned, these temporary roads are normally allowed to revegetate naturally or are planted with trees.

Pollutants from Silvicultural Activities

The major types of water pollutants that can be generated from forest management disturbances to the forest ecosystem include sediment, nutrients, pesticides, and debris.

1) Sediment

Sediment is the most common pollutant resulting from silvicultural activities. Sediment principally results from erosion of soil, but may also include organic matter. Excessive sediment upsets balanced ecology within streams by smothering bottom dwelling organisms in the water, interfering with photosynthesis by reducing light penetration, serving as carriers of nutrients and pesticides, inhibiting fish reproduction and altering stream flow.

2) Nutrients

Nutrients, primarily phosphorous and nitrogen fertilizers, are sometimes applied to the forest to stimulate tree growth. Soluble nutrients may reach surface or ground water through runoff, seepage, and percolation. Insoluble forms may be absorbed on soil particles and reach water by direct wash-off of debris and recently applied fertilizer. Excessive nutrients lead to an imbalance in natural life cycles of water bodies.

3) Pesticides

Pesticides, if applied during silvicultural activities, may be soluble or insoluble. Pesticides in surface or ground water may result in toxicity problems, affecting water quality and food sources for aquatic life.

4) Debris

Tree limbs, tree tops, and other waste materials are the principal organic pollutants from silviculture. They reach streams through direct pushing or felling into water drainages, and washout during storms. Organic materials may place an oxygen demand on the receiving water body during the decomposition process. In addition, associated problems may include odor, color, taste and nutrients. Inorganic material such as oil cans and pop bottles are also considered nonpoint source debris.

1.0 Forest Roads

Standards and Use

Forest roads are managed to provide adequate access to lands for timber management, fire suppression, wildlife habitat improvement and a variety of dispersed and developed recreational activities. Generally, these are low volume roads that must carry heavy loads for short periods of time. The potential for adverse impacts from forest roads exists in areas where steep slopes, erodible soils, or where forest roads are located near water. Forest roads cause more erosion than any other forestry activity. Most of this erosion can be prevented by locating, constructing, and maintaining roads to minimize soil movement and pollution of streams. The need for higher standard roads can be alleviated through better road-use management. Design roads to the minimum standard necessary to accommodate anticipated use and equipment.

Planning, Design, and Location

A well planned access system is a sound method of reducing erosion and sedimentation in areas requiring frequent or temporary access. Proper location and

construction of roads will provide for safety, longer operating periods, lower maintenance and operating costs, and minimal impacts to water quality. The value of the resource served and site characteristics will influence the choice of road construction standards and maintenance activities. The following practices are recommended:

1. Use a design to minimize damage to soil and water quality.
2. Roads should be designed no wider than necessary to accommodate the immediate anticipated use.
3. Design cut and fill slopes to minimize mass soil movement.
4. Provide culverts, dips, water bars, and cross drainages to minimize road bed erosion.
5. Design bridge and culvert installations using stream flow data, with a margin of safety proportional to the importance of the road and the protected resources.
6. Provide drainage where surface and groundwater cause slope instability.
7. Avoid diverting water from natural drainage ways. Dips, water bars, and cross drainage culverts should be placed above stream crossings so that water can be filtered through vegetative buffers before entering streams.
8. Locate roads to fit the topography and minimize alterations to the natural features.
9. Avoid marshes and wetlands.
10. Minimize the number of stream crossings.
11. Cross streams at right angles to the stream channel.
12. A road may not be located in a Streamside Management Zone (SMZ) except where access is needed to a water crossing, or where there is no feasible alternative. A road in any SMZ must be designed and located to minimize adverse effects on fish habitat and water quality.

Construction

Once the road's location and design is staked out, road construction begins. Timber is out, logs and vegetation are removed and piled along the lower side of the right-of-way.

Most forest roads are built by excavating a road surface. Road design and layout on-the-ground show machine operators the proper cut slopes and indicate cut slope steepness. The bulldozer starts at the top of the cut slope, excavating and sidecasting material until the desired road grade and width is obtained. Material from cuts is often pushed in front of the blade to areas where fill is needed. Road

fill is used to cover culverts and build up flat areas. Since fill must support traffic, it needs to be spread and compacted in layers to develop strength. The following practices are recommended:

1. Construct roads when moisture and soil conditions are not likely to result in excessive erosion or soil movement.
2. The boundaries of all SMZs shall be defined on the ground prior to the beginning of any earth-moving activity.
3. Construct a road sufficient to carry the anticipated traffic load with reasonable safety and with minimum environmental impact.
4. When using existing roads, reconstruct only to the extent necessary to provide adequate drainage and safety.
5. Avoid construction during wet periods, when possible, to minimize unnecessary soil disturbance and compaction.
6. Road grades should be kept at less than 10%, except where terrain requires short, steep grades.
7. Minimize the number of stream crossings. Stream crossing construction should minimize disturbance of the area in which the crossing is being constructed.
8. As slope increases, additional diversion ditches should be constructed to reduce the damages caused by soil erosion; ditches, adequate culverts, cross drains, etc., should be installed concurrent with construction.
9. To control erosion, cut and fill slopes should conform to a design appropriate for the particular soil type and topography.
10. Stumps, logs, and slash should be disposed of outside of the road prism; in no cases should they be covered with fill material and incorporated into road beds.
11. Stabilize the side banks of a road during construction to aid in the control of erosion and road deterioration; this may require mesh or other stabilizing material in addition to planting and/or seeding and other structural measures.
12. Water bars should be located to take advantage of existing wing ditches and cross drainage. Water bars should be constructed at an angle of 30 to 45 degrees to the road. Water bars should be periodically inspected and damage or breeches should be promptly corrected. Install water bars at recommended intervals to provide the drainage. Water bar spacing recommendations are as follows:

Grade of Road	Distance Between Water Bars
2%	250 ft.
5%	135 ft.
10%	80 ft.
15%	60 ft.
20%	45 ft.
25%	40 ft.
30%	35 ft.
40%	30 ft.

13. Water bars may need to be spaced closer together depending on soil type and rainfall.
14. Bridges and overflow culverts should be constructed to minimize changes in natural stream beds during high water.
15. Culverts on perennial streams should be installed low enough to allow passage of aquatic life during low water.

Maintenance

Maintenance of active and inactive roads shall be sufficient to maintain a stable surface, keep the drainage system operating, and protect the quality of streams. The following are recommended:

1. Maintenance should include cleaning dips and crossdrains, repairing ditches, marking culverts inlets to aid in location, and clearing debris from culverts.
2. Keep culverts, flumes, and ditches functional before and during the rainy season to diminish danger of clogging and the possibility of washouts. This can be done by clearing away any sediment or vegetation that could cause a problem. Provide for practical and scheduled preventative maintenance programs for high risk sites that will address the problems associated with high intensity rainfall events.
3. Conduct road surface maintenance as necessary to minimize erosion of the surface and subgrade.

4. During operations, keep the road surface crowned or outsloped, and keep the downhill side of the road free from berms except those intentionally constructed for protection of fill.
5. Avoid using roads during wet periods if such use would likely damage the road drainage features.
6. Water bars should be inspected after major rain storms and damage or breeches should be promptly corrected.

Harvesting - Temporary Access Roads and Landings

1. The location of temporary access roads (logging roads) should be planned before operations begin.
2. Road construction should be kept to a minimum.
3. Landings should be located to minimize the adverse impact of skidding on the natural drainage pattern.
4. Logging roads and landings should be located on firm ground.
5. Landings should be kept as small an area as possible.
6. When operations are completed, provisions should be made to divert water run-off from the landings and roads.

2.0 Pre-Harvest Planning

Pre-harvest planning is the collection of information about the area to be harvested and the synthesis of that information into an effective environmental plan. This plan will consider the silvicultural prescription for the species and site, the best estimate of the time and method of harvest and any post-harvest site preparation and reforestation activities.

At this stage, it is assumed that all federal, state, and local government regulations regarding harvesting have been met.

An effective pre-harvest plan will take into consideration all aspects of the timber harvest which may lead to water quality degradation and plan for the implementation of BMPs which will minimize or avoid the adverse effects of the operation. The objective of pre-harvest planning from the perspective of non-point source pollution is to determine which BMPs are necessary to protect water quality and how those BMPs will be implemented. The following is recommended:

(1) A pre-harvest plan should include the following information:

A. Physical and administrative description

- Property boundaries & administrative boundaries (zoning, etc.)
- Topography
- Location of streams and drainages
- Location of SMZs and buffer strips
- Forest types
- Soil types
- Areas of ecological and/or archaeological concerns

B. Management Activities

- Design and construction techniques for all new roads, skid trails, and landings or modification of existing roads, skid trails and landings.
- Felling and bucking techniques
- Yarding systems and layout
- Planned stream crossings
- Disposal of waste materials (machine lubricants)
- Post-harvest site preparation
- Reforestation activities

(2) The use of topographic maps, road maps, aerial photos, forest type maps, and soil surveys in combination with field reconnaissance is essential to determine site conditions and plan operations.

(3) Field reconnaissance with a trained forester or one who is knowledgeable about the specific area is highly recommended.

(4) Preliminary planning should consider the maintenance of existing drainage patterns and the location of environmentally sensitive areas such as streams, wet areas, and high erosion hazard areas.

(5) The design of roads, skid trails, and landings shall be integrated to minimize their impact.

(6) The grade of logging roads and skid trails should be less than 10% when possible, with 3-5% being the norm. Long, straight, unbroken grades are to be avoided. Adequate surface drainage shall be provided.

(7) Time the harvesting activity for the season or moisture conditions when the least impact occurs.

(8) A final pre-harvest site review shall be conducted by management so that road alignments and other considerations can be visually checked prior to road construction. The reconnaissance plan shall be modified as necessary to make desirable adjustments based on the final site review.

2.1 Timber Harvesting

Standards and use

Timber harvesting is an integral part of most forest management programs. Harvesting operations cause a temporary disturbance in the forest as well as diminish water quality. However, it can be conducted in a manner where the impact to water quality is minimized and the re-establishment of vegetative cover is realized. Guidelines to help reduce the potential for nonpoint source pollution from harvesting trees are as follows:

Felling and Bucking

1. Careful felling can minimize the impact of subsequent phases of the logging operation.
2. Trees should not be felled into streams, except where no safe alternative exists. In the latter case, such trees should be removed promptly.

Skidding

1. Skidding should be done so as to avoid disrupting natural drainage and to prevent excessive soil displacement
2. Stream channels or road ditches should not be used as skid trails.
3. Skid trails on steep slopes should have occasional water bars.
4. Servicing of equipment involving fuel, lubricants, or coolants should be performed in places where these materials cannot enter streams. Spent oil should be collected for proper disposal, never poured on the ground.
5. Upon completion of logging, erosion-prone areas should be mulched or seeded.

Mechanical Site Preparation

1. Avoid excessive soil compaction.
2. Minimize erosion and the movement of sediment into waters.
3. Prevent accumulation of debris in ponds, streams, or rivers.
4. Windrows, disking, bedding, and planting with "furrow" type mechanical planters should follow contours.
5. Avoid complete disking of steep slopes with extremely erodible soil.
6. Plant trees on contour.

Disposal of Debris and Litter

1. Logging debris in streams should be removed immediately.
2. Debris from landings should not be pushed into drains, streams or Streamside Management Zones (SMZs)
3. All trash associated with the logging operation should be promptly removed (not buried) and hauled to a legal disposal site.

3.0 Silvicultural Chemical Management

Description and Purpose

Pesticides are used on forest lands to facilitate meeting forest management objectives. The purpose of a pesticide application is to rid an area of undesirable vegetation or control insects or diseases to promote the establishment, survival, growth or maintenance of a desired species or condition.

Planning Considerations

Planning is an essential first step in reducing pest problems. A plan is needed by which the application of pesticides is utilized in an efficient manner that produces no adverse impacts on the environment. The maintenance of water quality is an important consideration in all aspects of pesticide operation planning.

Pesticide Selection

When the decision is made to use pesticides, choose products suitable for use on the target species and registered for the intended uses. Use only pesticides registered by the Environmental Protection Agency. Prior to using any pesticide, carefully read and follow all label directions.

When selecting pesticide options, more than effectiveness and cost should be evaluated. Consideration should be given to site factors, application conditions and techniques and products that can influence impacts to water quality.

Three main characteristics can greatly affect a pesticide potential to contaminate surface or ground water. They are solubility, absorption and breakdown rate.

1) Solubility

Solubility is the ability of a pesticide to dissolve in water. The greater the solubility, the greater the chance that the chemical will leach to ground water.

2) Absorption

Absorption is the inherent ability of a pesticide to bind with soil. Some pesticides stick very tightly to soil while others are easily dislodged. A greater absorption means a pesticide will remain longer in the soil and thus be less likely to leach down into the ground water before it has degraded. Absorption increases as soil organic matter increases.

3) Breakdown Rate

Breakdown rate or half-life is the time a pesticide takes to degrade or breakdown into other chemical forms. Pesticides that do not break down quickly can be hazardous if they move to ground water or surface water.

In a given situation, pesticides with the highest water solubilities, greatest persistence, lowest affinities for absorption to organic matter and other soil components, and highest application rates have the greatest potential for movement in surface water or to ground water. An alternative means of minimizing the potential movement of a pesticide is to select a non-broadcast application technique for the same pesticide that reduces the amount of the chemical applied directly to the soil.

Procedures for Chemical Use

Proper pesticide management practices make efficient use of chemical while preventing contamination of surface water or ground water. Residues of pesticides used in forestry can affect water quality at several phases of the chemical use cycle. These phases are:

- transportation
- storage
- mixing and loading
- application
- cleanup
- disposal To minimize potential impacts on water quality, use of the following practices is encouraged.

A) Transportation

1. Inspect all containers prior to loading and ensure all caps, plugs and bungs are tightened
2. Handle containers carefully when loading them onto vehicles
3. Secure containers properly to prevent shifting during transport
4. Check containers periodically enroute
5. Limit access to containers during transport to prevent tampering
6. Educate and inform the driver of the proper transportation precautions
7. Never transport pesticides unless arrangements have been made to receive and store them properly

B) Storage

1. Chemicals should be managed and stored in accordance with all applicable federal, state, or local regulations. These would include:
 - The EPA container registration label, as printed on the label
 - Label instruction for use as provided by the manufacturer
 - Requirements or the use, application, and registration of pesticides
 - Requirements relating to the licensing of applicators
1. All containers should be labeled in accordance with applicable federal, state and local regulations.
2. Store pesticides in their original containers with labels intact.
3. Do not store pesticides for extended periods in buildings that can not contain a complete spill from the largest container being stored.
4. Check containers prior to storage and periodically during storage to ensure that they are properly sealed.

5. Locate pesticide storage facilities at sites that minimize the possibility of impacts of water quality in case accidents or fires occur.
6. Use storage buildings that have floors constructed of concrete or other impermeable materials so that spills are easy to clean up.
7. Ensure that storage facilities can be secured under lock and key.
8. Post storage areas with a list of chemicals and quantities stored and notify the fire department about storage.

C) Mixing/Loading

1. Review the label before opening the container to ensure familiarity with current use directions.
2. Exercise care and caution during mixing and loading.
3. Replace pour caps and close bags or other containers immediately after use.
4. Mix chemicals and clean equipment only where possible spills would not enter streams, lakes or ponds.
5. Chemicals should not be applied where stream pollution is likely to occur through aerial drift.
6. Use a spray device capable of immediate shutoff.

D) Application

1. Refer to label directions before making a pesticide application.
2. Check all application equipment carefully, particularly for leaking hoses and connections and plugged or worn nozzles. Calibrate spray equipment periodically to achieve uniform distribution and rate.
3. Apply pesticides under favorable weather conditions. Never apply a pesticide when there is a likelihood of significant drift.
4. Always use pesticides in accordance with label instruction, and adhere to all Federal and State policies and regulations governing pesticide use.

E) Cleanup and Disposal

1. Before disposal, containers should be rinsed as described in equipment cleanup.

2. Cleanup should be in a location where chemicals will not enter any stream, pond, or where stream pollution might occur.
3. Rinse empty pesticide containers and mixing apparatus as many times as needed. This flushing should be applied in spray form to the treated area, NOT into the ground near streams.
4. Dispose of pesticide wastes and containers according to federal and state laws. Some pesticide wastes are specifically identified as hazardous wastes by law and must be handled and disposed of in accordance with hazardous waste regulations. For more information about proper management of waste pesticides, contact the Department of Health, Environmental Health Administration.

Other chemicals

Improper storage and handling of oil products and fuel can be a water quality hazard. Improper disposal of oil or fuel can contaminate ground water and seep into streams. The following are recommended:

1. Locate facilities away from streams and be prepared to clean up spills.
2. Know and comply with regulations governing the storage, handling, application (including licensing of applicators), and disposal of hazardous substances.
3. Do not transport, handle, store, load, apply or dispose of any hazardous substance or fertilizer in such a manner as to pollute water supplies or cause damage or injury to land, including humans, desirable plants and animals.
4. Do not store, mix, or rinse hazardous substances or fertilizers within the streamside management zone or where they might enter streams or waterways.
5. Develop a contingency plan for hazardous substance spills, including cleanup procedures.
6. Report all spills to the Department of Health, Environmental Health Administration.

4.0 Streamside Management Zone (SMZ)

The Special Management Zone (SMZ) is a specific area associated with a stream, lake, wetland or other waterbody that is designated and maintained during silviculture operations. The purpose of the SMZ is to protect water quality by reducing or eliminating forestry related outputs, i.e. sediment, nutrients, logging

debris, chemicals, and water temperature fluctuations that can adversely affect aquatic communities. SMZs provide shade, streambank stability and erosion control, as well as detritus and woody debris which benefit the aquatic ecosystem in general. In addition, the SMZ is designed to maintain certain forest attributes that will provide specific wildlife habitat values. Snags, den and cavity trees as well as mast producing trees, left in the SMZ, are necessary to meet habitat requirements for certain wildlife.

The SMZ has specific criteria, that defines operational restrictions and special management objectives. In addition, the SMZ has a specific width which is based on the size and type of waterbody involved.

A Streamside Management Zone (SMZ) is an area covered with vegetation or ground cover on both sides of perennial, intermittent streams and other bodies of open water, where extra precaution is used in carrying out forest management practices. The SMZ also provides shade and functions as a buffer when fertilizers, pesticides, etc. are applied to adjacent lands. For practical purposes, an SMZ must be wide enough to protect water quality and stream characteristics. Precaution is needed in carrying out forest management practices in order to protect bank edges and water quality. Determining the necessary width involves in part a judgement factor based on reliable local experience.

SMZs should be used where: 1) water quality is impaired and adjacent land use contributes to that degradation, 2) good water quality exists and protection against potential future impairment is desired, 3) streambank erosion is a concern, 4) wildlife habitat enhancement is desired, and/or 5) silviculture practices are to be implemented, and 6) the lower edge of cropland, grassland, or forest land is adjacent to permanent or intermittent streams, or border streams, rivers, ponds or intermittent or permanently flooded, open-water wetlands.

SMZ benefits include the following:

(1) Shade - Trees within the SMZs provide shade to maintain cool water temperatures which aid in the spawning of fish. Without trees and overhanging shrubs, stream temperatures would increase during the summer. Some fish species and aquatic organisms would then be unable to live in the streams. In the summer, water from shaded streams eventually flows into larger bodies of water and helps maintain its fish and aquatic life by keeping these waters cool all the way downstream.

- (2) Food - Leaves and insects drop into streams from overhanging trees and shrubs. In fact, 90% of the food in the forested streams comes from bordering vegetation.
- (3) Protection of Streambanks - Many streambanks are stabilized by streambank trees. They anchor banks and prevent erosion during periods of high water. Removing trees and shrubs and substituting shallow rooted grasses can lead to streambank collapse and stream sediment. Bank overhang is created by stream flows undercutting the stream bank and tree roots. Fish can rest, hide from predators, and feed in these protected areas.
- (4) Flooding - Healthy SMZs stabilize floodplains. During times of high water, SMZs reduce the velocity of floodwaters. Their dense vegetation and deep humus slow down racing waters. Forest floodplains suffer less damage when SMZs are protected during harvesting activities.
- (5) Recreation - The recreational activities that we enjoy in and around streams are many. This includes swimming, fishing, camping, hunting, and backpacking to name a few.
- (6) Timber Production - For those who grow and harvest trees, the fact is that trees often grow best in SMZs. Trees respond to those deep, fertile, and moist soils. Logging activities should not be eliminated within SMZs but modified to insure that stream channels and banks are protected from disturbance. SMZs are not timber harvest "keep out" zones, but there are locations where timber harvesting activities must be modified to protect the many benefits mentioned above.

Recommendations

SMZs should be maintained along all perennial streams or where forest disturbances occur and surface runoff will carry sediment loads. SMZs should be maintained around streams, ponds, perennial flowing natural springs, and all springs and reservoirs serving as domestic water supplies. The following best management practices are recommended:

1. The width of SMZs should be determined depending on the following conditions: slope of land adjacent to stream, soil erodibility, precipitation, knowledge of particular area, sensitivity of stream, etc. These factors can be obtained from soil maps, on-the-ground evaluation and measurements, weather data, etc.

- SMZs should be designed on a case-by-case basis. Most important is that SMZs be consistent with stream characteristics and wide enough to protect water quality.

Soil Type	Percent Slope	SMZ Width (each side)
Slightly erodible	0-5 %	35 ft.
Slightly erodible	5-20 %	35-50 ft.
Slightly erodible	20%+	50-160 ft.
Erodible	0-5 %	35-50 ft.
Erodible	5-20 %	80 ft. minimum
Erodible	20%+	160' minimum

3. Table 1. Recommended Widths for Streamside Management Zone
 [NOTE: Please contact your local Natural Resources Conservation Service office to determine the erodibility factor of the soil before determining the proper width of the SMZ.]

- On relatively flat terrain (0-5%) on slightly erodible soils, the width of an SMZ should be at least 35 feet wide on each side of a stream.
- On relative flat terrain (0-5%) on erodible soils, the SMZ width should range between 35 to 50 feet on each side of a stream.
- On slightly erodible soils with slopes ranging between 5 and 20 percent, the SMZ width should range between 35 to 50 feet wide on each side of a stream.
- On erodible soils with slopes ranging between 5 and 20 percent, the SMZ width should range between 50 to 160 feet on each side of a stream.
- On slightly erodible soils with slopes exceeding 20 percent, the SMZ width should be at least 80 feet on each side of a stream.
- On erodible soils with slopes exceeding 20 percent, the SMZ width should be a minimum of 160 feet on each side of a stream.
- Partial harvesting is acceptable. A minimum of 50% of the original crown cover or 50 square feet of basal area per acre, evenly distributed, should be retained in the SMZ. This may be adjusted to meet on-site conditions.
- Clearcutting is always prohibited within the SMZ.

9. Designate SMZs to provide stream shading, soil stabilization, sediment and water filtering effects, and wildlife habitat.
 10. Strive to protect the forest floor and understory vegetation from unnecessary damage. Do not remove (harvest) trees from banks, beds or slopes if it will destabilize the soil. Trees on the south and west banks provide the most critical shading of water.
 11. Access roads should cross perennial or intermittent streams at or near a right angle.
 12. Drainage structures such as ditches, cross drain culverts, water bars, rolling dips, and broad-based dips should be used on all roads prior to their entrance into an SMZ to intercept and properly discharge runoff waters.
 13. SMZs may be desirable on intermittent streams for large drainage areas where wildlife is a major landowner concern or for other reasons.
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5.0 Fencing

1. Fencing out livestock, pigs, and other animals in certain areas will help to prevent water quality degradation of streams, protect threatened and endangered plants, reduce soil compaction and maintain soil productivity. Fencing is applicable where desired forest reproduction, soil hydrologic values, existing vegetation, aesthetic values, and recreation are prevented or damaged by these animals.
 2. Pastures should be fenced separately from woodlands. Consider maintenance as well as ease of construction when planning a fence location. By taking advantage of natural barriers such as cliffs, the cost of animal exclusion can be reduced. Also consider use of fences to protect vegetation that provides wildlife food and cover.
 3. Fences should be permanent stock fences built in accordance with good construction principles and workmanship.
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6.0 Wildfire Damage Control and Reclamation/Prescribed Burn

The prevention, control, and extinguishment of all wildfires on grass, brush, and watershed lands and the implementation of a prescribed fire program is a desirable goal. Where wildfires do occur, the first and foremost concern is to control the fire and limit the damage. Fire suppression activities can add to the problem of water quality protection.

The loss of vegetative cover, destruction of soil-holding feature of root masses, the exposure of bare mineral soil, is a combination that makes the area burned a highly erodible one. The effects of suppression efforts and equipment operations necessary to control and stop the fire can magnify the erosion problem.

The following are best management practices for wildfire control and reclamation:

1. The first and foremost concern in wildfire control is to prevent harm or damage to people and property. Fireline best management practices should incorporate minimum impact strategies, which meet land and resource management objectives.
2. Areas with bare mineral soils should be revegetated and areas where vegetative cover has been killed or severely degraded should be regenerated with plant species appropriate for the soil conditions.
3. First priority for revegetation/reforestation should be given to banks of surface water bodies so that the SMZ is reestablished.
4. Firelines should be stabilized and, if necessary, revegetated. Erodible areas altered by suppression equipment activities should be repaired and revegetated as necessary.
5. Access road surfaces should be repaired and stabilized as necessary.
6. Whenever possible, avoid using fire suppression chemicals over watercourses and prevent their runoff into watercourses. Do not clean application equipment in watercourses or locations that drain into watercourses.
7. Provide advance planning and training for firefighters that considers water quality impacts when fighting wildfires. This can include increasing awareness so direct application of fire suppression chemicals to waterbodies is avoided and firelines are appropriately placed.
8. Include rehabilitative practices as part of suppression and post-suppression tactics and strategies to mitigate non-point source pollution.

6.1 Fireline Construction and Maintenance

Fireline construction and maintenance is an essential part of forest and other land management activities. It deals with site preparation burning, prescribed burning, and wildfire defense and control. A number of control practices can be implemented during fireline construction to prevent unnecessary erosion. Periodic inspection and proper maintenance can prevent potential erosion on established

firelanes. The following are best management practices for fireline construction and maintenance:

1. Firelines should be constructed on the perimeter of the burn area and along the boundary of the Streamside Management Zone. The purpose of protecting the Streamside Management Zone from fire is to safeguard the filtering effects of the litter and organic matter.
2. Firelines should follow the guidelines established for logging trails and skid trails with respect to waterbars and wing ditches, and should be only as wide and as deep needed to permit safe prescribed burns or fire suppression needs.
3. Firelines which would cross a drainage should be turned parallel to the stream or have a wing ditch or other structure allowing runoff in the line to be dispersed rather than channeled directly into the stream.
4. All firelines should be assessed after the fire is controlled for appropriate stabilization, and if necessary, proper rehabilitation should be done while equipment and people are in place.

6.2 Prescribed Burn

1. Intense prescribed fire for site preparation shall be conducted only if it achieves desired results with minimum impacts to water quality.
2. Burning on steep slopes or highly erodible soils should be conducted when they are absolutely necessary and should follow carefully planned prescriptions.
3. Carefully plan burning to adhere to time of year, weather, topography, and fuel conditions that will help achieve the desired results and minimize impacts on water quality. With proper planning, prescribed fires should not cause excessive sedimentation due to the combined effect of removal of canopy species and the loss of soil-binding ability of the subcanopy and herbaceous vegetation roots, in streamside vegetation, small ephemeral drainages, or on very steep slopes.
4. Site preparation burning creates the potential for soil movement. Burning in the SMZ reduces the filtering capacity of the litter. All efforts should be made to plan burns to minimize impacts on the SMZ.
5. All bladed firelines, for prescribed fire and wildfire activities, should be built so as to minimize erosion. If necessary, the firelines should be stabilized with water bars and/or other appropriate techniques to control

excessive sedimentation or erosion of the fireline. Include any erosion control practices in the construction of firelines.

7.0 Reforestation

Reforestation refers to those operations undertaken to establish a new forest. Site preparation, for the purpose of forest regeneration, is a basic silvicultural tool where for competing vegetation and reduction of logging debris are necessary. Common site preparation techniques include, manual, mechanical, fire, and herbicides.

Regeneration includes hand and machine planting and direct seeding. Since hand planting and direct seeding pose no water quality problems, BMPs are not necessary. Some mineral soil exposure does occur with machine planting and BMPs are offered.

1. Sites should receive the minimum preparation necessary to successfully control competing vegetation and establish a desirable timber stand. In general, the more intensive the treatment, the more concern for water quality.
2. When working on slopes, mechanical operations such as ripping, shearing, etc., should follow contours.

Hand planting, direct seeding or natural regeneration should be used on protected areas adjacent to streams or on slopes too steep to machine plant.