FINAL ENVIRONMENTAL ASSESSMENT

for

KIPAHOEHOE NATURAL AREA RESERVE
In accordance with

CHAPTER 343, HAWAII REVISED STATUTES

Proposed by:

State of Hawaii
Department of Land and Natural Resources
Division of Forestry and Wildlife
Natural Area Reserves System

September 23, 2002

Project Name	Kipahoehoe Natural Area Reserve Management Plan
Project Location	Kipahoehoe, South Kona, Hawaii, TMK: 8-8-01-5, 6, 7, 8, 10, 11, 12, 13
Applicant	State Of Hawaii Department of Land and Natural Resources Division of Forestry and Wildlife Natural Area Reserves System
Approving Agency	State of Hawaii Department of Land and Natural Resources
Agencies Consulted	Federal: U.S. Department of Agriculture Natural Resources Conservation Service U.S. Department of Interior Fish and Wildlife Service National Park Service USGS, Biological Resources Division State: Department of Land and Natural Resources Division of Conservation and Resource Enforcement Division of Forestry and Wildlife Land Division Historic Preservation Division Natural Area Reserve System Commission County: Planning Department Private: Bishop Museum Conservation Council for Hawaii Damon Estate Earthjustice Legal Defense Fund Hawaii Audubon Society National Wild Turkey Federation Native Hawaiian Advisory Council Native Hawaiian Legal Corporation Pig Hunters of Hawaii Sierra Club, Moku Loa Group The Nature Conservancy of Hawaii Wildlife Conservation Association of Hawaii Yee Hop Ranch

Determination, Findings and Reasons for Supporting Determination

1) Involves an irrevocable commitment to loss or destruction of any natural or cultural resources;

The proposed project is designed to improve and protect the natural and cultural resources of the Kipahoehoe Natural Area Reserve (NAR). Activities of the proposed project will include fencing and removal of nonnative plants and animals from managed areas. Native forests are not only a natural resource but a cultural resource as well. Protection of the natural resources directly correlates to the protection of the cultural resources of the area. Archeological sites that are known in the area will be protected from any disturbance. Any new sites discovered during the project will be treated in compliance with the requirements of the DLNR Historic Preservation Division.

2) Curtails the range of beneficial uses of the environment;

This project will not curtail beneficial uses of the environment of the Kipahoehoe NAR. The project will improve and protect habitat for native flora and fauna. The protected forest areas will also improve and maintain the quality of the South Kona Watershed.

3) Conflicts with the State's long-term environmental policies or goals and guidelines as expressed in Chapter 344, HRS; and any revisions thereof and amendments thereto, court decisions, or executive orders;

The proposed project is consistent with the Environmental Policies established in Chapter 344, HRS. The project is also consistent with the Natural Area Reserve policies outlined in Chapter 195, HRS.

4) Substantially affects the economic or social welfare of the community or state;

The economic welfare of the community should not be affected by the proposed project as there no economic activity within the boundaries of the Kipahoehoe NAR. The project will improve public access to the preserve and provide more recreational opportunities in the South Kona district, hence the social welfare of the community will not be detrimentally affected .

5) Substantially affects public health;

Public health will not be detrimentally affected by the proposed project. Preserving stands of forest can actually improve public health by maintaining and improving watershed quality.

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

This project will have no effect on the human population of the Big Island. As stated in the EA there is expected to be more public access to the preserve, but it will be controlled by the Division of Forestry and Wildlife (access keys, permits etc.).

7) Involves a substantial degradation of environmental quality;

The Management Plan for the Kipahoehoe Natural Areas Reserve is designed to improve and protect native flora and fauna as well as protecting cultural resources. Environmental quality will improve with the implementation of this plan.

8) Is individually limited but cumulatively has considerable effect on the environment, or involves a commitment for larger actions;

As stated previously, this project is intended to improve environmental quality and there will be no cumulative effect on the environment. With the construction of fence lines and improvements of roads, there will be some very limited short term damage to the areas cleared, but the benefits of fencing will far out weigh the temporary disturbance that will occur in the construction phase.

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

This project is designed to protect and enhance the habitat of rare and endangered species. Appendix B lists the species of plants that are listed as endangered or species of concern. Most of these plants are severely threatened by browsing by non-native ungulates. If no action is taken to fence and protect the areas where they persist extinction will be inevitable. Protecting forest habitat from ungulates will also enhance habitat for rare birds found in Kipahoehoe (Appendix C). By defining boundaries and fencing critical sections of the NAR, the threat of Koa logging by adjacent land-owners will be curtailed. Old growth koa trees are essential habitat for many of the rare birds found at Kipahoehoe.

During the construction phase of the project, measures will be taken to prevent any disturbance to Hawaiian Hoary bat habitat. Clearing of fence lines and roadways will be scheduled to avoid the breeding and pupping season of the bats (June-July). Any trees with bats found roosting in them will not be cleared.

An outplanting program of rare and endangered plants will further the survival of these species and increase diversity of the habitat.

10) Detrimentally affects air or water quality or ambient noise levels;

This project will have no detrimental affects on air quality, water quality or noise levels. Protecting the upper forests stands of Kipahoehoe, as this project is designed to do, will improve water quality in the future and protect the watershed.

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, freshwater, or coastal waters.

There is always the possibility that Mauna Loa could send a lava flow over the Kipahoehoe NAR, but this fatalistic approach is akin to someone not driving because they might die in a car crash.

12) Substantially affects scenic vistas and view planes identified in county or state plans or studies;

No affects to view plans will result from the proposed project.

13) Requires substantial energy consumption.

Energy consumption of the proposed project will be nominal. Small power tools, personnel transportation, and a bulldozer for road improvements are the only energy consuming elements that will be used. If a small shelter is built, it will not be wired for electricity.

Project Description

Summary:

The attached Plan describes proposed management activities to be undertaken in the Kipahoehoe Natural Area Reserve. Specific projects include construction and repair of access and boundary roads, and installation of fences to exclude livestock and feral animals from portions of the Reserve. Other actions include control of invasive non-native weeds, and planting of rare and endangered species to supplement natural populations. Also proposed are construction of a small cabin, and development of hiking trails for public use.

The project area is located entirely within the boundaries of the Kipahoehoe Natural Area Reserve. The Plan only addresses the portion of the Reserve located above Highway 11; a supplement for the coastal portion of the Reserve may be written at a later date. All project lands are State owned and within the Conservation District, Protected Subzone. Maps of the project area can be found in Appendix A of the Plan.

Affected Environment

Kipahoehoe Natural Area Reserve occupies 5,583 acres on the SW slope of Mauna Loa, a wedge shaped parcel that corresponds to the traditional *'ahupua'a* of Kipahoehoe. The Reserve extends from sea-level to 5600' elevation. Rainfall in the *mauka* Reserve averages 60 to 100 inches a year. Most of the Reserve is vegetated by a mosaic of different aged stands of *'ohi'a* (Metrosideros polymorpha) forest on a substrate of young (<2000 years) *'a'a* lava flows. A significant area was covered by the historic 1919 and 1950 flows; these are in the early stages of forest development. Several *kipuka* of older substrate occur above 3600' elevation. They contain deeper soil and well-developed *koa* (Acacia koa) dominated forests with a diverse assemblage of other native plants.

Flora:

The vegetation throughout the project area is predominantly native forest and shrubland. Some introduced plants are present, particularly near roads, pastures or in other disturbed areas. The Management Plan identifies and describes seven major vegetation types in the upper Reserve.

Several rare and endangered plant species have been observed within the project area. Most of these are located within the forested *kipuka*. See Appendix B of the plan for complete lists of plant species in the Reserve.

Kipahoehoe contains one of the few remaining tracts of undisturbed forest in South Kona. While a large part of the leeward slope of Mauna Loa remains forested, the natural vegetation has been altered by a long history of logging and cattle ranching. Development of coffee and macadamia nut farming is also contributing to the loss of native forest in the region.

Fauna:

Information about animals within the Kipahoehoe NAR is limited. See Appendix C for a list of bird species recorded from the Reserve. *'Elepaio* (Chasiempis sandwicensis), *'amakihi* (Hemignathus virens), *'apapane* (Himatione sanguinea) and *'i'iwi* (Vestiara coccinea) are common throughout the project area. *I'o* (Buteo solitarus) are frequently seen in the area, and nests have been observed in snag trees. The endangered *'akepa* (Loxops coccineus) and Hawaii creeper (Oreomystis mana) are known from similar habitat in the vicinity. Kipahoehoe is considered to be critical habitat for the *'alala* or Hawaiian crow (Corvus hawaiiensis). The last observation of a wild crow in the area was in the early

1980's. While it is unlikely that crows persist here, Kipahoehoe is an important site for possible reintroduction.

Although little is known about them, the *'opeapea*, or Hawaiian bat (Lasiurus cinereus semotus), is common in the vicinity of Highway 11, and undoubtedly uses trees within the Reserve as roosting sites.

Little is known regarding invertebrates in Kipahoehoe. Given the relatively intact condition of the native forests, it can be assumed that the Reserve still holds a diverse fauna.

Feral pigs are common throughout the NAR, especially in *kipuka* with well-developed soils. At higher elevations, feral goats are fairly common and small herds periodically move through the area. Feral, Mouflon and hybrid sheep are also present, but not in as large numbers as goats.

Feral dogs and cats, rats, mice, and mongoose are also found in the Reserve.

Significant & Sensitive Habitats:

The entire Reserve can be considered a sensitive habitat, particularly for native forest birds, the Hawaiian bat, and a variety of native invertebrates. Endangered species known to be present in the Reserve include the native lobeliads Cyanea hamatiflora and C. stictophylla. Plants considered Species of Concern (SOC) include Rubus macraei, Reynoldsia sandwicensis, and Phyllostegia floribunda.

Bobea timonides (SOC), Flueggea neowawrea (Endangered), and Phyllostegia stachyoides (SOC) were historically known from the vicinity; they may still be present in the Reserve.

Archaeological Sites:

No archaeological sites have been observed in the areas where most of the proposed activity would take place. Portions of the historic Ka'apuna trail, which passes through the Reserve, were located during recent field surveys. This trail was widened with a bulldozer years ago, obliterating any of the original historic construction. At lower elevations, undisturbed segments of what may be the historic *ala ehu* can still be found. Neither of these features will be damaged by the activities proposed in the plan. A short portion of the *ala ehu* might be reopened for use a public hiking trail; this is discussed in more detail in the Plan. The majority of actions proposed in the Plan will take place along existing road corridors, or will take place on recent lava flows, minimizing the likelihood that historic sites will be affected.

Impacts Resulting from Project

Short Term Impacts:

The primary short-term environmental impacts from this project will be those associated with improvement of roads and construction of fences. Destruction of vegetation and ground disturbance will occur in a strip 16 to 20 feet wide along road corridors. Noise and air pollution from small power tools, heavy machinery, vehicles, generators, etc. will be unavoidable during fence construction. Helicopter airlift of materials may be necessary on occasion. Increased human activity in the area, such as from work crews camping on site, will be necessary. This increase in activity may disturb native birds and/or bats in the immediate vicinity.

Long Term Impacts:

Proceeding with the activities proposed in this plan will likely lead to an increase in human traffic in this remote area. This, and the unavoidable disturbance associated with fence and road

construction create the potential for negative effects. Most significant are greater potential for inadvertent introduction of new weed species, and further spread of non-native plants already present in the Reserve.

Constructing new roads and fences, and siting a cabin in the upper Reserve may affect the "wilderness" character of this remote area. The site chosen for the cabin is a bulldozed clearing near an existing road; no additional site preparation will be necessary. The structure will only be visible from the air and will have no impact on views from roads or trails in the vicinity. Building a cabin will have the positive effect of concentrating unavoidable human impacts in a single place. Presently, workers camp in tents, and camp sites tend to sprawl over a large area. Poor sanitation near camping areas can lead to an increase in cats, rats, mice and mongoose, resulting in greater predation on native birds and plants. Installing an outhouse or composting toilet at the cabin will reduce this problem.

Installing a water catchment and storage tank near the cabin will have the additional positive effect of providing a water supply on-site in the event of fires.

Constructing a new *makai* access road will be an open invitation for the public to visit the upper Reserve. Even if a locked gate is placed on the road, it will not exclude foot, bicycle, motorcycle or all-terrain vehicle traffic. This unsupervised use of the area could create a greater risk of fire, weed introduction and damage to rare plants. Also likely is increased trespass onto neighboring private lands. The alternate *mauka* access proposed in the plan would avoid these problems, but will not be feasible until neighboring properties change ownership.

Reopening a portion of the *ala ehu* as a hiking trail could lead to damage to the trail itself, or other historic sites nearby. Damage to native vegetation near the trail, and spread of weeds along the trail corridor, are likely. Trail development may also lead to problems associated with hikers parking their vehicles on the roadside, such as safety, increased theft, etc.

Long-term benefits of this project include regeneration of native vegetation within the fenced area. Grazing within the *kipuka* has resulted in the destruction of much of the natural forest understory. Native tree seedlings, herbaceous ground cover and ferns have been largely extirpated. The result has been an increase in sunlight reaching the forest floor. These conditions have favored the establishment of non-native grasses, which compete with and prevent the establishment of native plant seedlings. Long term studies of similar areas (particularly in Hawaii Volcanoes National Park) show that native plants can often reestablish themselves and shade out non-native competitors if animal disturbance is removed. Koa is a prolific seeding, fast growing tree that will rapidly recolonize disturbed areas once grazing pressure is removed.

Additionally, the fenced, animal free areas will be available as outplanting sites for rare and endangered species. At present, efforts to reintroduce and enhance populations of species appropriate to this area have been hampered by the presence of pigs and goats.

Excluding pigs will also remove the primary vector by which seeds of the most invasive weeds are being spread. Some of the most invasive weed threats are species of guava and passionfruit, which are readily distributed in the droppings of pigs that have eaten the fallen fruit.

Socio-economic impacts:

Proceeding with this project will require spending the funds necessary for the proposed actions. Costs will include purchase of fencing material, contracting with land surveyors, helicopter and bulldozer operators, paying salaries of Reserve staff, vehicle operating expenses, etc. These monies will come from normal NAR operating funds, which have already been obligated. Supplemental funding will be sought in the form of grants from agencies such as the US Fish & Wildlife Service. It is expected that a large portion of these monies will be released back into the economy in the form of payments to local vendors and contractors.

The primary social impact resulting form this project will be the permanent removal of 1000 acres from an area now (technically) available for public hunting. This is not expected to be a significant impact for several reasons. The project area represents less than 20 percent of the 5,583 acre Kipahoehoe NAR, the majority of which will remain open for hunting for the foreseeable future. Little, if any, hunting is now taking place in the upper Reserve. This is due to the remote location of the site, and lack of public access.

The area to be fenced will remain available for non-hunting use. However, due to the sensitivity of the area, unregulated public use of the upper Reserve will not be encouraged.

In addition to the remaining portion of Kipahoehoe, there are large tracts of State land that will remain available for public hunting in the South Kona and Ka'u Forest Reserves. These nearby areas are more suitable for hunting and recreation use, and will not be affected by the actions described in this plan.

Positive social impacts from this project include protection and restoration of a unique and aesthetically pleasing Hawaiian forest; available for nature appreciation, education and research, and the preservation of a remnant of our rapidly disappearing natural heritage.

Cultural impacts:

This project will have no negative effect on cultural activities, other than removal of a small area from public hunting use. Discussion of whether the hunting of game animals of European origin constitutes a "traditional" cultural activity is outside the scope of this document.

Pre-contact Hawaiian use of upland forests such as those in Kipahoehoe was likely limited to activities such as gathering plant materials, and bird-catching. At present, these activities are prohibited by NAR rules. Proceeding with this project will have no effect on present statutes.

It is beyond the scope of this document to evaluate the standing of "gathering rights" within the Natural Area Reserves System. Gathering is not now allowed. If laws were to be changed, this project would potentially have a positive impact on gatherers of traditional materials, as it is designed to protect and enhance the native plant and animal life that they might collect.

Mitigation Measures

As stated earlier, the major impacts from this project are vegetation related. Damage to living native plants will be restricted to within the road/fence corridors, and no living trees greater than 12 inches diameter will be cut. No legally protected plant species have been observed near the proposed fence lines, but an additional reconnaissance of all fence and road corridors will be made before work begins. Significant plants will be marked with flagging, and/or alignments will be shifted to avoid damage.

Weed introduction will be minimized by ensuring that all heavy equipment, fence material, tools, boots, etc. have been cleaned before entering the project area. The long-term management plan for the Reserve includes regular monitoring and control of newly introduced species of non-native plants along fence lines and access roads.

No archaeological sites have been seen within the area to be disturbed by this project. Fence and road alignments will be chosen to utilize previously disturbed areas where ever possible. Should any sites be discovered during construction, work will be halted and the proper authorities notified. Before any of the historic trail remnants are opened for public use, the State Historic Preservation Office will be consulted.

No mitigation is planned to compensate for removal of a portion of the Reserve from a public hunting area. The hunting public would be well served if DOFAW were to develop create access to other Forest Reserve tracts in the South Kona region. However, this is not the responsibility of the NARS program, but of other programs within the Division of Forestry and Wildlife.

Alternatives to Project

Several alternatives to this project have been identified and are discussed here.

Alternative #1:

Proceed with the project as described in the Plan. Incrementally build fences around selected portions of the NAR, and remove all feral ungulates from these areas. Public hunting would be used for animal control when feasible, but NAR staff would do the majority of the removal. Seven to eight miles of fence would be required, predominantly along existing roads. An access road to the upper Reserve would be constructed, and a small cabin built for the use of work crews. Non-native plant control and rare species recovery efforts would continue.

This is the preferred alternative, as it the most feasible, and in keeping with the Natural Area Reserve Law and the Management Policies of the Natural Area Reserves System. (Chapter 195, HRS)

Alternative #2:

Construct fences that enclose a single large area; encompassing the entire Reserve above Highway 11. This large unit would require roughly 16 miles of fence to enclose 4000 acres. Feral ungulates would be removed from all of the NAR above the highway.

While it might seem desirable to remove feral ungulates from as much of the NAR as possible, this alternative is not cost-effective or feasible. The most significant biological resources occur in a relatively small area at higher elevation, and would be protected in the plan described in Alternative #1.

Before fences could be built around the entire Reserve, the boundary would have to be surveyed, and perimeter roads built. It would be nearly impossible to remove feral ungulates from an area of this size. Cross fences would be required to reduce the large area to multiple units of more manageable size. This cross fencing would increase the expense and disturbance associated with the project.

Alternative #3:

No fences. Construct a road to improve access to the upper Reserve, and rely on public hunting as the sole means to control ungulate populations.

While this might appear an inexpensive and politically palatable scheme, this alternative was rejected for several reasons.

As long as the Reserve boundaries remain unfenced, feral animals will continue to enter the area form adjacent private lands. It is doubtful that hunting pressure within the Reserve will be great enough to significantly decrease feral animal damage. Trespassing and conflicts with neighboring landowners would be inevitable. Encouraging more human traffic in the area will also increase the likelihood of fires, introduction of new weed species and damage to rare plants.

Alternative #4:

Construct a system of fences and an access road, as described in the Plan. Use public hunting as the sole means to reduce feral animal populations inside the fenced areas.

Installing fences will prevent animal ingress, and may reduce the danger of trespass mentioned in Alternative #3. The other problems associated with unsupervised public activity in the sensitive upper Reserve remain. Increasing public hunting may reduce animal numbers within the fenced areas to some degree, but it is doubtful that complete eradication will result.

In recent years, several attempts have been made to use public hunting as the primary tool for control of feral animals in remote Hawaiian natural areas. While some of these projects were good for public relations, they have all been unsuccessful in achieving their primary goal. This goal was the long-term reduction of animal damage to levels comparable to that achieved by professional hunters, snaring, etc.

There are many reasons why public hunting is not an effective way to control feral animals over the long term. A sudden increase in hunting pressure in an area with large numbers of "tame" animals may result in large numbers of animals being taken at first. Over time, those that remain become wary and difficult to catch. Hunters eventually lose interest in travelling to the remote area, game populations rebound, and the cycle begins again. If fences are to be built, it is important that all animals be removed from within them as quickly as possible.

Alternative #5:

Build no fences or access roads. Animal control restricted to other measures, including snares, aerial shooting, staff hunts, etc.

These methods may be more effective in reducing animal damage than relying on public hunting alone. In the short term, this will be less expensive than the cost of fencing large areas. However, as long as the Reserve boundaries remain open, there will be ingress of animals from adjacent lands. Animal removal would have to continue indefinitely. This long-term control program would be expensive and unpopular, as it would be perceived as an unending "waste of meat" by the hunting community. The best long-term solution is to enclose the Reserve, and remove all animals as quickly as possible.

Alternative #6:

No action.

Implies continued neglect of the Reserve and acceptance of the inevitable degradation of this unique natural resource.

Expected Determination

No significant negative impact on the environment is expected from this project.

Findings and Reasons Supporting Expected Determination

The intent of this project is to benefit native species in the project area. Creating permanent barriers to exclude feral ungulates will remove a major threat to the continued survival of the native

forests in the Reserve. Creating secure sites for reintroduction of rare plant species is necessary for their survival in the wild.

Ample evidence exists to show that disturbance caused by ungulates is a factor contributing to replacement of Hawaiian vegetation by introduced weeds. If animals are removed before damage becomes too severe, native vegetation is often able to recover naturally and the spread of weeds slowed or even reversed. Implementing a weed control program will increase the probability of native vegetation recovery, and prevent the establishment of new noxious plant species. The short term damage to vegetation as a result of building fences and roads will be more than offset by the regeneration that will take place once animals have been removed.

Environmental Assessment Prepared By:

Bryon Stevens
Natural Areas Specialist
P.O. Box 4849
Hilo, HI 96720
(808) 974-4221
974-4226 fax

E-mail: narshi@interpac.net

Sources of Information:

Hawaii Branch NARS staff field notes 1996-2000

Kipahoehoe Natural Area Reserve Management Plan, prepared by DLNR/DOFAW, 1989.

Kipahoehoe Natural Area Reserve Resource Information, prepared by the Nature Conservancy of Hawaii, 1989.