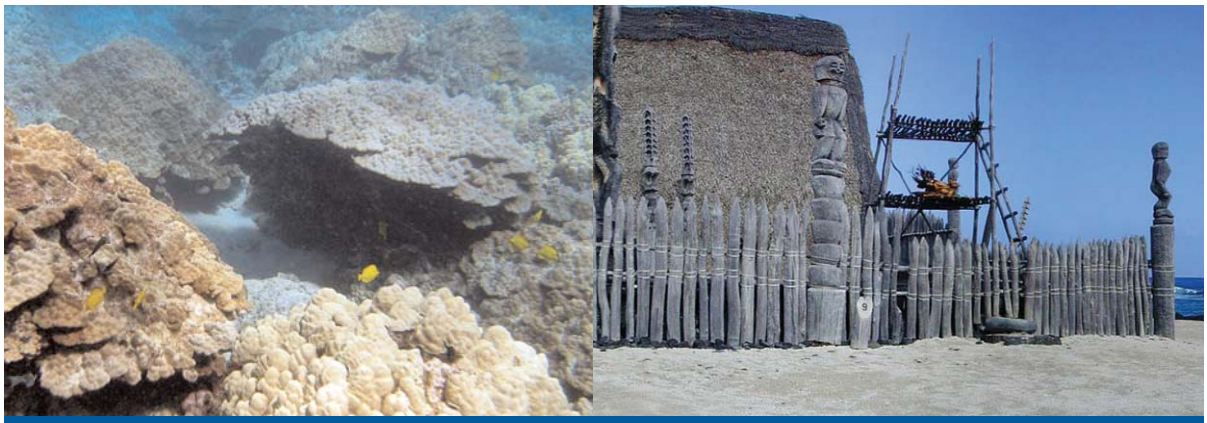


Environmental Consequences

Top left: Coral reef, Kaloko-Honokōhau NHP; top right: Pu'uhonua o Hōnaunau National Historical Park; bottom: Anaehoomalu Petroglyph Preserve. NPS photos.

Chapter 4: Environmental Consequences of the Alternatives

Introduction

National Park Service (NPS) planning guidelines stipulate an environmental impact statement (EIS) must be prepared for all national trail comprehensive management plans. The National Environmental Policy Act (NEPA) requires that an EIS disclose the environmental effects of proposed federal actions. In this case, the federal action would be the adoption of the comprehensive management plan for the Ala Kahakai NHT by evaluating the consequences of implementing the three alternatives. The alternatives establish broad management guidelines, and their general nature requires that the assessment of impacts also be general. The NPS can make some reasonable projections regarding impacts, but these are based on assumptions that may not prove to be accurate in the future. Therefore, this plan may be considered a programmatic EIS.

Consistent with NEPA and NHPA Section 106, any proposed actions in the future would be preceded by site or segment specific compliance, prepared in consultation with the Environmental Protection Agency (EPA), U.S. Fish and Wildlife Service (USFWS), the State Historic Preservation Division (SHPD) of the Department of Land and Natural Resources (DLNR), other state and federal agencies, Native Hawaiians, local communities, and private landowners. It is anticipated that such documents would reflect a considerable shift in emphasis from qualitative to quantitative analyses.

In the case of the Ala Kahakai NHT, the federal government owns only 17% of the trail corridor. The remaining 83% of the corridor traverses state, county, and private landholdings. Federal government regulations would apply only to those lands that are owned in fee or on which there is a federal undertaking, such as federal funding or licensing. As time goes on and more trail segments become official components of the Ala Kahakai NHT, more of the trail may come under either federal administration or management. Nonetheless, the implication of this landownership pattern is that many of the actions recommended in this plan are non-federal. This plan serves as a partnership document. It lays out guidelines by which the NPS can make recommendations or work with other non-federal levels of government, nonprofit organizations, and interested persons in order to implement the recommendations.

Chapter 3 identifies the existing conditions for all impact topics that are analyzed. Impact analyses are presented in this document by describing the impacts of each alternative on each resource topic. Each impact topic includes a description of the impact of the alternative, a discussion of cumulative effects, and a conclusion. At the end of the discussion of the impacts of each alternative on each impact topic, as required by NEPA, there is a brief discussion of unavoidable adverse impacts, irreversible and irretrievable commitments of resources, and the relationship of short-term uses of the environment and the maintenance and enhancement of long-term productivity. Finally, the environmentally preferred alternative is presented.

Unmanaged area, S. Kohala, NPS photo

Methodology

The Ala Kahakai NHT is not established on the ground. There is no experience of past management of the Ala Kahakai NHT to rely on in assessing the impacts of specific actions. While the four national parks have segments of the trail and manage their resources according to NPS standards, the trail within the parks is not yet marked or managed as the Ala Kahakai NHT. Actions within the trail corridor outside of federal lands will continue to affect sites and trail segments that could be incorporated into the Ala Kahakai NHT. This CMP will provide the guidelines for adding those sites and segments of trail to the NHT. It will also provide guidance to the national parks regarding the trail.

Impact analyses and conclusions are based on NPS staff knowledge of resources, the project area, and administration and management of other national historic trails; review of existing literature; and information provided by experts in the NPS, other agencies, or organizations, or by knowledgeable individuals. Any effects described in this section are based on the proposals for the alternatives and the reasonable expectations of the impacts they might have. Little quantitative information is available for the entire trail corridor. Therefore, the best professional judgment was used in determining potential effects.

The impact analyses for the no-action alternative compare desired resource conditions in 2020 to existing conditions in 2006 as if existing budgets and funding remain flat. The impact analyses for the action alternatives (alternatives B and C) compare those alternatives in 2020 with the no-action alternative in 2020. In other words, the impacts of the action alternatives describe the *difference between* no-action and implementing the action alternatives. Impacts have been assessed as if the resource protections and management measures described in chapter 2 would be implemented. If these measures were not applied, the potential for resource impacts and the magnitude of those impacts would increase.

Impact Terminology

Based on the guidelines of the National Environmental Policy Act (NEPA) and its implementing regulations from the Council on Environmental Quality (1978), the consequences of the actions in the alternatives, including direct, indirect and cumulative effects are described in terms of impact type, duration, intensity, and whether the impact would be direct or indirect. Cumulative effects are also identified.

Impact type

Adverse: involves a change that moves the resource away from a desired condition or detracts from its appearance or condition.

Beneficial: involves a positive change in the condition or appearance of a resource or a change that moves the resource toward a desired condition.

In some cases, the action could result in both adverse and beneficial effects for the same impact topic.

Duration

Unless otherwise stated, the standard definitions for duration are as follows:

Short term: the effect occurs only during or immediately after the implementation of an aspect of the alternative.

Long term: the effect could occur for an extended period after implementation of an aspect of the alternative. The effects could last several years or more and could be beneficial or adverse.

Intensity

Impact intensity is the magnitude or degree to which a resource would be beneficially or adversely affected. Each impact is identified as negligible, minor, moderate, or major in conformance with specific definitions for each impact topic. Each resource has its own intensity standards that are listed in tables associated with each impact topic.

Direct Versus Indirect Impacts

Direct: impacts occur at the same time and the same place as the action.

Indirect: impacts occur later and a farther distance from the action.

Cumulative Impacts

Impacts on the environment can result from the incremental impact of the action when added to the other past, present, and reasonably foreseeable future actions, regardless of what agency or person undertakes the action. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time.

To determine potential cumulative impacts, projects within or near to the trail corridor were identified by examining other existing plans and by telephone discussions with national park staff, state and county agencies, and other helpful individuals. Projects identified are past actions, plans or actions that are currently being implemented, and reasonable foreseeable future plans or actions.

Projects Comprising the Cumulative Impacts Scenario

The following are plans and actions by agencies, organizations, or persons that could affect the national trail and regional natural, cultural, and recreational resources, the visitor experience, or the socioeconomic environment.

Federal

New Highway—Waimea to Kawaihae Harbor, Federal Highway Administration. The FHWA has proposed constructing an improved 14-mile stretch of upgraded highway between the central and west Hawai'i town of Waimea to Kawaihae Harbor near the district of South Kohala. A notice of intent to prepare an EIS for the proposed project has been issued (NPS 2004: 4-15).

Short Austere Airfield (SAAF) Runway, Department of Defense, Department of the Air Force. The Department of the Air Force proposes to build an $18 million 4,250-foot by 90-foot "short, austere airfield" for C-17 combat practice landings at Keahole International Airport in Kona to train C-17 aircraft crews stationed at Hickam Air Force Base. A Finding of No Significant Impact was issued in November 2004. The C-17s can transport the fast-response Stryker Brigade of about 300 eight-wheeled armored vehicles (Honolulu Advertiser).

Besides being able to handle short take-offs and landings, C-17 pilots will practice landing approaches from random directions and spiral approaches from high overhead. Operations on the training site would take place at least once a day, averaging about four hours a day. That averages to about 16 landings in four hours, or one landing every 10 to 15 minutes. Flight operations will occur at night and during the day (Honolulu Star Bulletin).

Stryker Brigade Combat Team, US Army. Hawai'i is the location for an interim force based on the Stryker vehicle, or a Stryker Brigade Combat Team (SBCT). For training exercises at the Army's Pohakuloa Training Area (PTA), troops, SBCT vehicles, and equipment for training support would arrive at Kawaihae Harbor. Convoys would travel on a proposed new two-lane gravel military vehicle trail between the harbor and PTA. There would be up to 10 trucks and 24 Strykers per trip. The vehicle trail will cross state highways at Kawaihae Road north and east of Queen Ka'ahumanu Highway (Tetra Tech, 2004).

State

Commercial Harbors Master Plan 2030. Kawaihae Harbor currently operates under the *Hawai'i Commercial Harbors 2020 Master Plan* developed by the Harbor Division of the State Department of Transportation. Work on the next plan for 2030 may begin as early as May 2007 (Soma, 2006). This plan will look at the long-range needs of Kawaihae harbor, and will include public access and use provisions as required by the state. Ala Kahakai NHT administration will encourage protection of the ancient trail alignment.

Kawaihae Harbor dredging and Expansion—Kawaihae Harbor. The US Army Corps of Engineers and the state of Hawai'i are proposing to deepen and expand the Kawaihae Harbor. The project consists of an entrance channel, the harbor basin, and a "rubble mound" breakwater. The current harbor basin is approximately 35 feet deep, and accommodating the new vessels would require a harbor basin of at least 40 feet.

Modifications are proposed to the west breakwater, and wave absorbers or breakwaters on the north side are proposed to reduce surge problems. The southwest part of the harbor is the primary port for military equipment, supplies, and personnel destined for the Army's Pohakuloa Training Area (PTA), 18 miles southwest of Pu'ukoholā Heiau National Historic Site. An environmental assessment was prepared in spring 2005, with construction to begin by 2008 (NPS 2004c: 4-14).

Proposed Kīholo State Park. The proposed Kīholo State Park is an eight-mile long undeveloped coastline *makai* of Queen Kaahumanu Highway stretching from Pu'uwa'awa'a northward through Pu'u Anahulu to the southern end of 'Anaeho'omalu Bay. The reserve encompasses an approximately 4,300-acre coastal lava plain. "Noteworthy natural, cultural and recreational resources include extensive coastal wildland environment, good swimming beaches at Kīholo Bay and Keawaiki Bay, the Akahu Kaimu anchialine pools, Luahinewai Pond, and the historic coastal trail and its archaeological features"(State of Hawaii, 2004). A park at Kīholo would insure retention of the fast-disappearing natural open space and the open coastal views from the highway. The area currently includes a 3-acre State Park Reserve used for public recreation on which the house formerly belonging to Loretta Lynn is located. The Division of Conservation and Resources Enforcement (DOCARE) monitors public use and enforces applicable state regulations on all state-owned lands within the Kīholo area. Preliminary natural, cultural, recreational resource studies are completed along with archival historical research and oral histories. DLNR is seeking funds to complete furthers studies and develop a master plan for the park.

Proposed Kona Kai Ola. The 530-acre project site of the proposed Kona Kai Ola is located in Kealakehe, North Kona adjacent to Kaloko-Honokōhau NP. The site is owned by the state of Hawaii with 200 acres owned by DHHL and 330 acres owned by DLNR. This area includes approximately 40 acres of the Kealakehe Parkway proposed right-of-way within the project area and approximately 22 acres of land to be used potentially for the proposed Kealakehe Parkway extension south through Queen Liliuokalani Trust lands. This parkway extension is subject to future negotiations and agreements with Queen Liliuokalani Trust. The EIS Notice of Preparation is dated July 2006 (Oceanit, 2006). Approximately 15.5 acres of the proposed project area were authorized by the U. S. Congress to be part of the Kaloko-Honkōhau NP, but are not currently protected by the NPS. (NPS 2006).

In exchange for major infrastructure improvements—the Kealakehe Parkways improvements and an 800 slip harbor contiguous to the existing Honokōhau Harbor—Jacoby Development, Inc. received the right from the Board of Land and Natural Resources (BLNR) to develop a project with land uses including retail/restaurant, resort hotels and timeshare units, light industrial/marine uses, open space, public access, and recreational water features. The project would be built in phases over an approximate 14-year period. The preliminary concept plan includes a 400-foot development setback from the shoreline in which an ocean-front trail is depicted (Oceanit, 2006). The Ala Kahakai NHT is not mentioned in the Notice of Preparation, and it is unclear if the archeology and cultural resources assessment will include a search for and protection of the ancient or historic coastal *ala loa*.

County

Kawaihae/Waimea Road — Island of Hawai'i. Hawai'i County Public Works Department is investigating traffic mitigation measures along Kawaihae Road from Waimea Park to Merriman's. The intent is to use the existing road corridor and, after minor paving and other improvements, to remark the roads with through-lanes and turning pockets. The county is also studying a project to provide for a state right-of-way for a road to replace the Kawaihae/Waimea Road (County of Hawaii 2002). There are no other county of Hawaii road projects in the areas of Pohakuloa, Kawaihae, or Waimea (NPS 2004c, p. 4-14).

Connector Road between Mamalohoa Highway and Kawaihae Road. The county has begun to plan for a connector road between Mamalohoa Highway and Kawaihae Road in the vicinity of Lalamilo Farm Lots to the north or Lalamilo Farm Road. Belt Collins is preparing the environmental impact statement (Brown, 2007).

Other Proposals and Projects

Hawaii Superferry, Inc. Consistent with the current *Commercial Harbors Master Plan 2020*, Hawaii Superferry Inc. proposes to start operating a ferry from Oahu beginning in 2009. Built to carry 866 passengers, it would also be capable of carrying 282 to 325 cars. Twenty-eight trucks as long as 40-feet could be accommodated (*The Ka'ū Calendar*, 2007). It would operate seven days a week with at 11:45 a.m. arrival at Kawaihae and a 12:45 departure each day. The state is building a barge and ramp system to allow vehicles to get on and off the ferry. Existing harbor facilities will accommodate the maximum vehicle load; however, assessment of damage to the piers from the October 2006 earthquake is underway and new mooring positions may need to be constructed (O'Halloran, 2006). Concerns have been raised for impacts to traffic on roads and at parks and other public facilities, and on the potential introduction of plant diseases and alien plant species. No environmental impact statement has been required, but at least one member of the county Council has asked for one to be completed prior to the Superferry starting business on Hawai'i Island (*The Ka'ū Calendar*, 2007).

Resort Developments. Waikoloa, Hualalai, Mauna Lani Resorts are continuing to complete phased developments for which they have existing permits.

Large Private Developments.

Mahukona— has permits not yet used.

Kohala Waterfront — described by C&H Properties, the owners, as "elite Big Island properties on the Kona/Kohala coast at the Kohala Waterfront form a beautiful oceanfront/ocean view community on the island of Hawaii. On this luxury real estate, you can create your own private haven with a spacious lot, with dynamic ocean and mountain views destined to be enjoyed for a lifetime (C&H Properties, Inc.)." No mention of trails is made in the sales information. However, the SMA permit and approved subdivision does provide for a 10-foot wide pedestrian trail along the top of the sea cliff. Public parking and *mauka-makai* pedestrian access to the trail is also required. Although the easement is recorded, the lateral trail is not discernable on the ground (Brown, 2007).

O'oma Development — this project adjacent and north of the Kohanaiki development has an approved zoning change and SMA permits, but building approval may be postponed until the Queen Ka'ahumanu Highway widening to the airport is completed (Brown). The development plan includes residential uses, an 18-hole golf course, a public shoreline park with facilities and camping, and an alignment of the Ala Kahakai NHT as the existing shoreline trail.

Shores at Kohanaiki — Construction is underway in this 4448-acre luxury home (500 single-family) and golf course development in the *ahupua'a* of Kohanaiki *makai* of Queen Ka'ahumanu Highway and adjacent to the north boundary of Kaloko-Honokōhau NP. Plans include a 129-acre public shoreline park with facilities and camping and an alignment of the Ala Kahakai NHT as the existing shoreline trail. Extensive land modifications have

created high platforms adjacent to the Kaloko-Honokōhau NP boundary on which houses are to be built.

Hōkūli'a — This 1,540-acre development located in Kona near Kealakekua Bay includes plans for 665 luxury homes, a golf course, and related amenities. The developers are required to protect many previously unidentified cultural sites, build a new public highway to ease traffic congestion in Kona, build 100 or more units of affordable housing in Kona, complete a 140-acre public shoreline park spanning about three miles of coastline, add additional parking and recreational facilities to this Kona Scenic Park, and conduct a baseline water quality study along an approximately 11-mile stretch of the Kona coast. The Hawaii Supreme Court determined that the property contains 3 government-owned trails parallel to the coastline: an old government road, a stepping stone trail, and an old cart road. These trails will most likely come under the purview of Nā Ala Hele. The court required that an advisory council for the trails be established, and that easements be negotiated. Hōkūli'a will be required to maintain the trails according to direction developed by the advisory council.

Old Kona Lagoon Hotel Site — the site of the demolished Old Kona Lagoon Hotel just south and adjacent to the Outrigger Keauhou Beach Resort and north of the Keauhou Surf and Racquet Club Condominiums is planned for development by the owners, Kamehameha Schools.

South Kona Coast — The Magoon family sold several *ahupua'a* parcels on their property south of Ho'okena. One owner has subdivided his parcel, and as a result, is required to work with Nā Ala Hele to provide lateral shoreline access across his property. It is possible that future subdivisions in this area may require public access to the shoreline trail as a condition of use.

Punalu'u Resort — planning to expand Punalu'u's long-dormant Sea Mountain resort, "Sea Mountain Five recently completed its draft environmental impact statement on the proposed project, which calls for 434-acre resort complex including two resorts with over three hundred rooms, two retail areas, and about 1,500 housing units, including three-bedroom homes, duplexes, triplexes and cluster townhouses. Plans propose to develop within the parameters of the existing permit" (McNarie, 2006). Environmental organizations have expressed concerns about the resort's effects on the area, including effects on endangered species. Ka'ū Preservation has been fighting resort development of the area for years. It recently revealed its own plans to convert the area to a "living classroom" with educational facilities and two restaurants (McNarie, 2006).

Honu'apo Fish Pond and Coastal Area — In March 2006, 225 acres of historic coastal land in the Honu'apo area of Ka'ū became permanent public land through combined efforts of the Trust for Public Land, the state of Hawaii, the county of Hawaii "2% fund," the National Oceanic and Atmospheric Administration coastal preservation fund, the original landowners (Landco), and private funds ranging from pocket change to large donations. The county is responsible for these lands aided by a new non-profit group, Ka 'Ohana o Honu'apo, formed to guide a stewardship process (Trust for Public Land). The Ala Kahakai NHT traverses this area.

Honu'apo, Ka'u, NPS photo

Analysis Assumptions

The following assumptions were used to guide the analysis of environmental consequences:

- The NPS and its partners would have the ability to request funding or develop needed funding sources and personnel to implement any one of the alternatives.
- Trail protection, interpretation, marking, and development would only occur after completion of specific trail segment resource inventories and management plans and further environmental compliance.
- The planning period of the analysis is generally the next 15 years (to 2020 approximately).
- The planning area for the environmental analysis at a minimum is the trail corridor generally comprised of the coastal strand and coastal plain as shown on the alternatives maps. The area for impact analysis may change depending upon the topic and information available.
- Specific actions to protect human life would be taken under all plan alternatives.
- The regulations, laws, and policies described in chapter 1 under "Legal and Policy Requirements" inform the range of actions.
- Visitors to the area of the trail corridor will continue to increase as will population, but few visitors will come to the island of Hawai'i specifically to visit the Ala Kahakai NHT.

Information Sources and Gaps

The impact analysis and conclusions are based on information available in the literature, data from park studies and records, and information provided by experts within the NPS, other agencies, and nonprofit organizations. In addition, relevant laws, regulations, and NPS management policies were used in development of impacts.

Data for all resources are limited. Since most of the trail corridor is privately owned, most of the corridor lacks a systematic inventory of natural and cultural resources. The NPS contracted with the SHPD to prepare a compilation of all known cultural resources within the corridor, but the project was not completed and the information was not available for this plan. However, the completed portion of the study will be useful to trail management once its findings are organized. Environmental impact statements prepared for projects along the shoreline could provide some information, but it was beyond the scope of this project to review them systematically. Often, existing studies are incomplete and generally identify archeological resources without concern for traditional cultural properties and resources significant to Native Hawaiians. Using what is known from existing inventories and relying on their best professional judgement, planners can only estimate, the number, type, and significance of the range of cultural and natural resources.

Even within the four NPS parks, inventories are not complete. The NPS *Vital Signs Monitoring Plan* for all Pacific Island parks includes some information for the Ala Kahakai NHT taken from inventories underway or completed in the four national parks for vegetation, terrestrial vertebrates and invertebrates, freshwater and anchialine pool communities, marine communities, and water quality. The monitoring plan notes the need for more inventories in all of these areas within the national parks.

This CMP recommends initial assessment and overview studies for the entire trail. More specific inventories would be completed as trail segments are incorporated into the Ala Kahakai NHT and site specific, quantitative compliance evaluations and measures are implemented.

Impairment of Resources (NPS Properties)

In addition to determining the environmental consequences of the alternatives, NPS policies require that potential effects be analyzed to determine whether proposed actions would

impair resources or values of the Ala Kahakai NHT. Most of the lands along the route are nonfederal. The following impairment discussion would apply only to those lands that are federally owned in fee title or lands with less than fee title such as conservation easements, leases, or agreements.

While Congress has given the NPS the management discretion to allow certain impacts within parks, that discretion is limited by the statutory requirement (enforceable by the federal courts) that the NPS must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. This cornerstone of the Organic Act establishes the primary responsibility of the NPS. It ensures that park resources and values will continue to exist in a condition that will allow the American people to have present and future opportunities for enjoyment of them.

The impairment that is prohibited by the Organic Act and the General Authorities Act is an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values. Whether an impact meets this definition depends on the particular resources and values that would be affected; the severity, duration, and timing of the impact; the direct and indirect effects of the impact; and the cumulative effects of the impact in question and other impacts.

An impact to any park resource or value may constitute an impairment. An impact would be more likely to constitute an impairment to the extent that it affects a resource or value whose conservation is necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park; key to the natural or cultural integrity of the park or to opportunities for enjoyment of the park; or identified as a goal in the park's general management plan or other relevant NPS planning documents. An impact would be less likely to constitute an impairment to the extent that it is an unavoidable result, which cannot reasonably be further mitigated, of an action necessary to preserve or restore the integrity of park resources or values.

Impairment may occur from visitor activities, NPS activities in the course of managing a park, or activities undertaken by concessioners, contractors, and others operating in the park.

In this chapter, an impairment determination is presented in the conclusion section for each impact topic.

Effects on Cultural Resources

Methodology and Assumptions

The following discussion of cultural resources includes analyses of potential impacts to archeological resources, historic structures, and cultural landscapes related to the Ala Kahakai NHT. Each of those resource types may also be eligible for listing as traditional cultural properties (TCPs), and all cultural resources have the potential to be of on-going cultural significance to Native Hawaiians without regard to their eligibility for listing on the national register as TCPs. These resources are discussed separately in chapter 3, but impacts to them are discussed together here because distinctions between them are not easily made and the full extent of these resources is not known. Archeological resources and historic structures contribute to the cultural landscape and every aspect of the landscape can be important to contemporary cultural groups. Since most of the management actions proposed in the alternatives affect a combination of these resources, the effects discussed below are considered to include all types of cultural resources.

Cultural resources are subject not only to provisions of the NEPA and its implementing regulations from the Council on Environmental Quality, but also with Section 106 the National Historic Preservation Act with implementing regulations at 36 *Code of Federal Regulations*

Part 800. Therefore, the impact criteria for cultural resources are presented in a different format from the other impact topics in this environmental impact statement. In addition, it is important to note that certain resources assessed by the NEPA guidelines as natural resources later in this EIS will also be evaluated as cultural resources using 36 *Code of Federal Regulations* Part 800. These are anchialine pools and fishponds and marine resources related to traditional coastal harvesting.

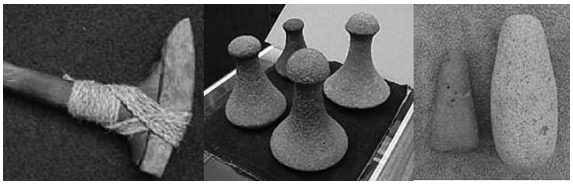
As described in the Section 106 implementing regulations, application of the criteria of adverse effect to a proposed action results in a finding of either adverse effect or no adverse effect.

> An **adverse effect** would be an action that would alter, directly or indirectly, any of the characteristics of a site, structure, or landscape pattern or feature that would qualify the landscape for inclusion in the National Register of Historic Places in a manner that would diminish the integrity of the design, setting, materials, workmanship, feeling, or association. Some elements of cultural landscapes, such as structures, are nonrenewable, so adverse effects on these character-defining elements would be long-term. Other elements of cultural landscapes, such as vegetation, may be renewable, and effects on these elements would be more short-lived (for example, until regrowth occurred). An adverse effect would have to be resolved consistent with the methods outlined in 36 *Code of Federal Regulations* Part 800.6.
>
> Under a **no adverse effect** determination, the direct or indirect effects of the action would not meet the Section 106 criteria for adverse effect.

Under Section 106, in cases where there are no national register-eligible cultural properties or landscapes present, or where, if present, these resources would not be affected by undertakings proposed in this plan, a finding of "*no historic properties affected*" is made. However, for the Ala Kahakai NHT, cultural resources that may not be eligible for the NRHP but are significant to contemporary associated groups will be considered using Section 106 criteria. Ancient and historic trail fabric, archeological sites, shrines (*heiau*, '*ahu*), burial sites/reburials, petroglyphs, and grinding surfaces, *wahi pana* (places sacred or special to Native Hawaiians) and natural resources considered as cultural resources, such as food and fish gathering areas, fish ponds, caves, salt pans, and ethnobotanical resources—all work together to create the cultural setting of the trail whether or not they are eligible for the NRHP. Even resources not eligible for the NRHP need consideration for preservation if they are important to affiliated groups.

Information used in this assessment was obtained from relevant literature and documentation, maps, and information provided by experts within the NPS, other agencies, and nonprofit organizations. In addition, relevant laws, regulations, and NPS management policies were used in development of impacts.

NEPA intensity thresholds for cultural resources are provided only within the no adverse effect category. For impacts of minor intensity, the thresholds address adverse or beneficial changes. The thresholds for moderate and major impacts only consider beneficial changes because unfavorable changes of these magnitudes would result in a Section 106 finding of adverse effect (see above). Once an adverse impact is identified, ways would be considered to avoid, minimize, or mitigate it.



Left to right: Adze, Poi Pounder, Fishing net weights, NPS photos

Impact intensity	Impact Description
Negligible	The effects on cultural resources would be at the lowest levels of detection, barely measurable with neither adverse nor beneficial consequences. Impacts would neither alter resource conditions, such as traditional access or site preservation, nor the relationship between the resource and the affiliated group's body of practices and beliefs. The determination of effect for Section 106 would be *no adverse effect*
Minor	The action would improve protection of a site, preservation of landscape patterns and features as well as the integrity of location, design, setting, materials, workmanship and association. Site protection would allow access to traditional resource areas or accommodate a group's traditional practices or beliefs. Minor impacts could be beneficial or adverse. For purposes of Section 106, the determination of effect would be *no adverse effect*.
Moderate	The action would noticeably enhance the protection of a site, preservation of landscape patterns and features as well as the integrity of location, design, setting, materials, workmanship and association. Site protection would encourage traditional access or accommodate a group's practices or beliefs. The determination of effect for Section 106 of would be *no adverse effect*.
Major	Stabilization, preservation, or rehabilitation of a site or landscape features would substantially enhance protection of a site, preservation of landscape patterns and features as well as the integrity of location, design, setting, materials, workmanship and association and would facilitate traditional access or accommodate a group's practices or beliefs. The determination of effect for Section 106 of would be *no adverse effect*.

The area of analysis for cumulative impacts is defined as the coastal strand and inland plain up to the Mamalahoa Highway or Hawaii Belt Road.

Effects on Cultural Resources from Alternative A: No Action

Analysis

Cultural resource management would continue under current laws, policies, and regulations as they relate to NPS property and authority. Actions and subsequent impacts under alternative A are limited to NPS-owned lands—the four national parks—and to the authorities of the National Trails System Act as applied to non-federal segments of trail incorporated in the Ala Kahakai NHT. Trail segments on non-federal lands would only become official components of the Ala Kahakai NHT with landowner consent through management that would require, among other things, a classification of the trail type, an inventory and assessment of trail resources, and a protection and monitoring plan.

The NPS park managers would continue established resource protection measures within the national parks, and the Ala Kahakai NHT staff would encourage resource protection through agreements along the few segments of trail that could be included in the Ala Kahakai NHT under alternative A. As possible, Ala Kahakai NHT staff would encourage research on trail resources to support protection and interpretation of the trail. Trail segment additions would require inventory, evaluation, and documentation of archeological sites, historic buildings, traditional cultural properties, and resources significant to contemporary Native Hawaiians to determine how many resources may contribute to the trail character and history and therefore be eligible for listing in the NRHP.

Any control by trail administration over effects on resources outside of federal areas, and perhaps state and county parks, would be limited to the trail right-of-way and an agreed upon protection area adjacent to the trail. While trail fabric and resources in close proximity to the trail could be protected, influence on the broader cultural landscape would rest with agreements with interested landowners. New research on cultural resources, archeological inventories, identification, and evaluation of traditional cultural properties and cultural landscapes may be completed along the trail route within the national parks and along trail segments that become components of the national trail.

Trail sites would become official components of the Ala Kahakai NHT through an agreement with the site managing authority that assures protection of the resource and consideration of Section 106 of the NHPA. Trail sites and segments would be under the administrative authority and oversight of the NPS, but would be managed by others through these agreements.

None of these agreements are in place at this time, but there is potential under alternative A within the planning period to develop agreements for 12 of sites[49] other than national parks included in the auto tour. One of these 12 sites is a National Historic Landmark, 3 are on the NRHP, and 4 have state recognition. Evaluation of eligibility of the 4 remaining sites for the state or national registers could be completed under alternative A as well as a reevaluation of the nominations for the existing sites to include traditional cultural properties, cultural landscapes, and information on significance to traditionally associated peoples. As sites along the auto tour are incorporated into the Ala Kahakai NHT, these sites would receive NPS oversight and protection through monitoring. Where potential impacts would be identified, possible mitigation could include, but would not be limited to, avoidance and protection or educational outreach programs.

The state would continue to inventory ancient and historic trails and attempt to protect them as development occurs, but generally would not have the capacity to open them to the public. Trails on the Nā Ala Hele inventory could be held through land banking, but if they cannot be managed by the state or the NPS, over time they could possibly be quit claimed.

Under alternative A, ancient or historic trail fragments may be lost. The evidence of ancient and historic trails is especially vulnerable to removal as landowners prepare their properties for development. During the development approval process, the county would determine if a trail fragment is an archeological site or a public access right-of-way. If a trail fragment is determined to be an archeological site, it would likely be abandoned as a trail.

Some resources may be protected by landowners by virtue of their limiting public use of their property but only if they make no significant changes to their property. Trail fabric resources within the route, but not yet included in the Ala Kahakai NHT, would continue to be affected by development along this highly desirable shoreline. Looting and digging by artifact hunters and amateur "archeologists" using existing trails or other means of access would continue.

These impacts could be more severe with added public use on existing trails that are not yet incorporated into the Ala Kahakai NHT or as more areas become accessible to the public. Added public use may result in increased tension between traditional users and hikers who are not from the area. Although cultural practices along those parts of the route included in the Ala Kahakai NHT would be respected and recognized by trail administration and in management

[49] Lapakāhi State Historical Park, Puakō Petroglyph Preserve, Waikōloa Petroglyph Preserve, Huilheʻe Palace, Ahʻena Heiau, Kamoa-Keolonāhihi, Laʻaloa, Kahaluʻu Bay, Lekeleke Kuamoʻo,Keauhou Hōlua , Lekeleke & Kuamoʻo Battle Site, Kealakekua Bay State Historical Park including Hikiau Heiau, Mokuʻohai Battleground, South Point National Historic Landmark District, and Punaluʻu Ruins.

agreements, traditional use may be limited by the loss of trails to development. Trail resources important to contemporary associated groups could be lost.

Cumulative Effects

The trail fabric and associated resources of the *ala loa* have been adversely impacted by natural causes such as lava flows, tsunami and high waves, and the sinking of the western coast of the island of Hawai'i. By far the greatest adverse impacts have come from construction of towns, transportation facilities, resorts, and residences. In 1991, *Backpacker* magazine and the American Hiking Society declared the trail a threatened resource (Curtis, 1991). Under the no action alternative, development, looting, and vandalism would continue to threaten trail resources. Trail recognition would continue to be fragmented and the public access value of the shoreline trail could override the cultural and historical values of the *ala loa* through requirements imposed on developers by state and county government.

The size and number of projects listed in the cumulative impacts scenario from South Kohala through South Kona and in Ka'ū affecting the shoreline and coastal plain would result in altering the patterns and features of the landscape of the region and affecting archeological resources and historic structures. Projects surrounding the trail could affect the integrity of the cultural landscape of the trail.

Actions of alternative A could encourage the national parks along the route to include cultural practices of Native Hawaiians and thereby have a minor beneficial effect on traditional users. On those few nonfederal segments of trail incorporated into the Ala Kahakai NHT under alternative A, appropriate cultural practices would be allowed resulting in possible minor beneficial effects on traditional practitioners. Outside of these areas cultural practitioners could experience minor to major adverse impacts from projects in the cumulative impacts scenario, depending upon the degree to which development affects the relationship between resources and practices and beliefs.

On the positive side, as developers are required by the state to identify cultural resources and state-owned trails, trail segments eligible to be part of the Ala Kahakai NHT may be identified. However, once development is approved, current zoning and development regulations and practices at the county level may not be adequate to maintain the landscape character and view planes important to Hawaiian cultural concepts. It is likely that the trail will travel through golf courses or be surrounded by residential development. While the use of the trail would be preserved, the cultural context could be lost.

Ancient and historic trail fabric may be destroyed on nonfederal lands by projects in the cumulative impacts scenario. Rather than requiring protection of cultural resources in place, planning permits may allow "mitigation" of adverse effects by a recovery only approach. Since few trail segments could be incorporated into the Ala Kahakai NHT under this alternative, few nonfederal resources within the trail corridor would have NPS oversight.

Conclusion

The actions called for in alternative A would have negligible to minor direct and indirect beneficial effects to the four national parks and would have potential moderate beneficial effects on the few trail segments on nonfederal lands added to the national trail. There would be no adverse impacts to NRHP properties related to the Ala Kahakai NHT on national park lands. Monitoring and oversight of trail sites could have minor to moderate short and long-term beneficial effects on the properties included on the auto tour, especially those eligible for the NRHP. All actions taken under alternative A would promote the national recognition of the trail in a limited way resulting in minor beneficial effects. New research on cultural resources within the national parks and on nonfederal trail segments would add to

better understanding and appreciation of the significance of this national historic trail providing a minor to moderate long-term benefit.

Existing zoning and development regulations may not adequately protect the trail and its associated cultural resources, including significant features of the cultural landscape, resulting in potential long-term moderate to major adverse impacts. Without NPS monitoring and oversight of NRHP properties on nonfederal lands, other than those on the auto tour, potential minor to moderate adverse impacts could occur. Inadvertent or intentional damage or destruction of trail fabric and cultural resources by private landowners would be a long-term moderate to major adverse impact.

Continuing growth in the county and the development projects in the cumulative impacts scenario would have long-term moderate to major adverse impacts on the cultural landscapes and associated cultural resources within the trail corridor. This, in turn, would have long-term moderate to major adverse impacts on the Native Hawaiian traditional practices and values that are so closely linked to physical places.

Cultural resources along substantial portions of the trail route not included in the Ala Kahakai NHT could be inadvertently desecrated by unknowing trail users or vandalized and looted by artifact hunters, causing long-term moderate to major negative effects on traditional culture and practices.

The long-term consequences to cultural resources of alternative A could be moderate to major adverse impacts in varying degrees along the trail route outside of the national parks.

No impairment of cultural resources on NPS lands is anticipated.

Effects on Cultural Resources from Alternative B: Single Trail

Analysis

Cultural resource management includes all the actions noted in alternative A; however, many more trail segments and resources would be incorporated into the Ala Kahakai NHT as the goal of a continuous trail is approached. In a situation like that which occurs at Hōkūli'a in which there are three parallel ancient and historic trails—an old government road (OGR), a stepping stone trail, and an old cart road— one trail would be selected as the route of the Ala Kahakai NHT. The choice would be between the old cart road or the OGR, both of which are continuous through the property. The other trails would be protected by court order, but they would not be included in the Ala Kahakai NHT.

Trail additions would require inventory, evaluation, and documentation of archeological sites, historic buildings, traditional cultural properties, and resources significant to contemporary Native Hawaiians to determine how many resources may contribute to the trail character and history and therefore be eligible for listing in the NRHP. Alternative B proposes added federal funds to administer the trail, increasing the potential for expanded cultural resource inventories, assessment, protection, and monitoring, should the funds be forthcoming.

The NPS would continue management of federal segments and have administrative oversight on nonfederal trail segments and sites. NPS technical experience with cultural resource protection and interpretation would be available to more trail site and segment managers through management agreements. Alternative B would provide the major benefit of protecting more ancient and historic trail segments than alternative A. These actions would require adequate staff or funds to hire professionals to conduct the determinations of eligibility. Since there is no guarantee that funding and staffing needed to implement these actions will be

Cultural Festival, Kaloko-Honokōhau NHP, N. Kona; NPS photo

available, full implementation of alternative B could be many years in the future. In the meantime, a lack of action may result in minor to moderate adverse effects on the various cultural resources that define the national trail.

The NPS would rely on strong partnerships with state and county agencies, local nonprofits, and private landowners to develop management scenarios for trail segments. Also, the NPS would rely on the county to implement zoning and other development regulations that work toward protecting the nationally significant cultural resources of the trail on nonfederal land. A lack of action by partners may result in minor to moderate adverse effects on the various cultural resources that define the national trail. However, under alternative B, the NPS would offer additional assistance to the state to develop its capacity to protect segments of the coastal *ala loa* identified by Nā Ala Hele as state-owned and to open them for public use. Also, this alternative would be implemented incrementally as the NPS develops capacity within itself and its partners to complete segment management plans and to carry out inventory, assessment, management, and monitoring, thus reducing negative effects on cultural resources on those parts of the trail administered or managed by the NPS.

As in alternative A, the auto tour would be completed and nonfederal sites along it brought under the administrative oversight of the NPS.

In areas where a trail segment or site has not been incorporated into the Ala Kahakai NHT, cultural resources along the trail route could be adversely affected by inadvertent desecration by unknowing trail users or by vandalism and looting by artifact hunters causing moderate to major adverse effects. These impacts could be more severe with added public use on existing trails or as more areas become accessible to the public.

Segments of the ancient and historic *ala loa* would be preserved and made available to traditional users. Cultural practices along the route would be respected and recognized by trail administration and in management agreements.

Cumulative Effects

The combined effects of all actions potential under alternative B would promote preservation of a linear trail and its associated resources, including traditional cultural properties and resources significant to contemporary associated groups. The moderate to major adverse effects of the cumulative projects past, present, and ongoing of the region would be the similar as those described in alternative A, but Alternative B would add a small increment of benefit to the total of cumulative effects on cultural resources in the region. Actions of alternative B could have a minor to moderate beneficial effects on Native Hawaiian lifeways and practice directly associated with the Ala Kahakai NHT, somewhat offsetting the adverse impacts in the region resulting from the projects in the cumulative impacts scenario.

Conclusion

As in alternative A, the actions called for in alternative B would have negligible to minor direct and indirect beneficial effects on the four national parks. They would have potential long-term beneficial effects on the trail segments on nonfederal lands added to the national trail.

Incorporating more trail segments on nonfederal land into the Ala Kahakai NHT would have the long-term beneficial effect of increasing research and knowledge of cultural resources that would

contribute to better understanding and appreciation of the significance of this national historic trail to the culture of Hawai'i. Short and long-term moderate beneficial effects would result from heritage tourism that contributes to a better understanding and appreciation of the Ala Kahakai NHT and the Hawaiian culture. Since more of the ancient and historic trail would be identified as the Ala Kahakai NHT and made available to the public, the actions taken would better promote the national recognition of the trail, providing a long-term direct and indirect moderate beneficial impact on cultural resources.

There would be no adverse impacts to NRHP properties related to the Ala Kahakai NHT in the four national parks. The potential for adverse impacts to NRHP properties on nonfederal lands would continue, but it is likely that more of these properties would be brought under the administrative oversight of the NPS under this alternative resulting in a moderate beneficial effect. With assistance from the federal government, the state may be better able to protect cultural resources along trail segments identified by Nā Ala Hele as ancient or historic. These actions would contribute to a determination of no adverse effect for these properties.

Alternative B would have potential long-term minor to moderate beneficial effects on the properties included on the auto tour.

Added support of Nā Ala Hele by the NPS would have long-term minor to moderate beneficial effects on cultural resource protection. Research and information sharing could have a long-term minor to moderate beneficial impact by providing land owners along the trail with a model for preserving such resources and contributing to the broader preservation of the Hawaiian culture through public understanding.

The potential would continue for minor to major adverse impacts to occur on nonfederal trail segments through actions of county and state governments due to existing zoning and development regulations that may not adequately protect cultural resources including significant features of the cultural landscape. Private landowners who have not completed agreements with the NPS may also inadvertently or intentionally damage or destroy cultural resources creating long-term minor to major adverse effects. The evidence of ancient and historic trails is especially vulnerable to removal as landowners prepare their properties for development.

Since this alternative emphasizes a single, linear trail, ancient and historic trail fragments that would not contribute to trail continuity might be lost to development through the county planning process. This loss would be a long-term moderate to major adverse impact on archeological resources. Opportunities for interpretation could be lost.

Facilitation of traditional access or accommodation of traditional users' practices or beliefs along managed segments of the Ala Kahakai NHT would provide moderate beneficial effects under alternative B. In areas outside of those trail sections incorporated into the Ala Kahakai NHT, cultural practitioners could experience negligible to major adverse impacts depending upon the degree to which development affects the relationship between resources and practices and beliefs.

No impairment of resources on NPS lands is anticipated.

Effects on Cultural Resources from Alternative C: Ahupua'a Trail System

Analysis

Cultural resource management under alternative C includes all those actions noted in alternatives A and B; however, the NPS administrative scope would be expanded to include not only the continuous linear trail but a traditional network or system of trails on public lands or on the private lands of interested landowners. Participation in the trail by landowners is voluntary.

With the inclusion of *mauka-makai* trails, the national parks would be more broadly affected by trail recognition under alternative C than the

other alternatives. Trail administration would work closely with park management to ensure that trail marking and use does not adversely affect cultural resources and the visitor experience of the parks. Park management plans, to the extent possible within park purpose and significance, would be amended to accommodate and support the approved CMP. The parks may experience some short or long-term benefit from the community support provided by trail partnerships.

Alternative C would provide inventories of more sites and trail segments and evaluation of them for inclusion in the NRHP than the other alternatives.

Under alternative C, through an agreement with the state, the NPS would have the option to gain less-than-fee interest in and management responsibility for the trails identified as ancient or historic in the Nā Ala Hele inventory within the Ala Kahakai NHT corridor, including those trails crossing private lands. This action would increase the federal role in the trail and provide the ability to enforce NPS regulations (36CFR, parts 1-5) and Section 106, but only within the trail right-of-way owned by the state.

This action would require adequate staff or funds for consultants to complete trail segment management plans and staff to implement the plans. To mitigate these expenses, the alternative includes the provision for community-based management led by an active and robust Ala Kahakai Trail Association and local trail management derived from the *ahupua'a* and individuals with strong ties to the land. The trail association would be expected to raise significant funds to contribute to the needs of implementing this alternative. Trail segment management entities may contribute to funding, as feasible. Implementation of this alternative would depend not only on future NPS funding and service-wide priorities, but also on partnership funds, time, and effort. Lack of any of these elements may mean that projects and programs proposed under alternative C may not be realized.

By allowing choices of trails available for public use, trail sites important to Native Hawaiians could be better protected through redirection of trail users. For example, under alternative C, the three trails—an old government road, a stepping stone trail, and an old cart road—identified by the state for protection in Hōkūli'a could become part of the Ala Kahakai NHT, rather then selecting one as in alternative B. The stepping stone trail, the oldest of the three, is not continuous and would not be included in alternative B. Under alternative C, it could become an interpretive feature allowing visitors to experience the ancient trail fabric. The three parallel trails provide the opportunity to interpret the evolution of the trail system in Hawai'i.

Like alternative B, this alternative provides the advantage of considering the trail as one entity, but while alternative B would evaluate cultural resources along a specific trail right-of-way and adjacent areas, under alternative C broader landscapes or ecosystems could be evaluated on public lands. This broader view would allow protection of TCPs and resources significant to associated contemporary groups along with the web of small trails, traditional and historic sites, and places of resource collection. Ancient and historic trail fragments within the trail corridor that do not contribute to a continuous trail could be protected on public lands and on private lands with the consent of the landowner. This action would have a long-term beneficial impact on the setting and character of the trail on public lands.

With the emphasis on the preservation, protection, and interpretation of cultural features and landscapes that sustain the practice of Hawaiian values, there would be more opportunities to perpetuate the actual practice of traditional Hawaiian stewardship values. These actions would have a long-term beneficial effect of keeping viable the cultural setting of the trail and enhancing the visitor experience through exposure to more aspects of the Hawaiian culture.

The potential would continue for adverse impacts to occur on nonfederal trail segments

through actions of the local and state governments due to zoning and development regulations that may not adequately protect cultural and historic resources. The potential for adverse impacts to NRHP properties on nonfederal lands would continue, but it is likely that more of these properties would be brought under direct oversight of the NPS under this alternative. Private landowners who have not completed agreements with the NPS may also inadvertently or intentionally damage or destroy cultural resources. Trails are especially vulnerable to removal as landowners prepare their properties for development.

In areas where a trail segment or site has not been incorporated into the Ala Kahakai NHT, cultural resources along the trail route could continue to be inadvertently desecrated by unknowing trail users or vandalized and looted by artifact hunters. These impacts could be more severe with added public use on existing trails or as more areas become accessible to the public. Nonetheless, alternative C would encourage access for traditional users and accommodate associated group's practice or beliefs.

As with the other two alternatives, the NPS must rely on partners to implement the management agreement for each trail segment and site. Also, the NPS must rely on the county to implement zoning and other development regulations that work toward protecting the nationally significant cultural resources of the trail on nonfederal land. A lack of action by partners in implementing adequate trail protection measures or ineffective community-based management could result in moderate to major adverse effects on the various features that comprise the setting and cultural landscape of the trail. However, alternative C would be implemented incrementally as the NPS develops capacity within itself and its partners to complete segment management plans and to carry out inventory, assessment, management, and monitoring, thus reducing negative effects on cultural resources on the parts of the trail administered or managed by the NPS.

Cumulative Effects

Cumulative impacts related to the cumulative impacts scenario would be similar to alternatives A and B. Alternative C has the potential to protect and interpret for the public more cultural resources than the other two alternatives. More archeological sites, traditional cultural properties, and landscapes significant to Native Hawaiians would be inventoried and evaluated for significance and recognition in the NRHP. Potentially, more of the trail would come under federal jurisdiction. Traditional access and practices would be better protected partially offsetting the adverse impacts in the region resulting from the projects in the cumulative impacts scenario. Alternative C would add a small beneficial increment to the total of adverse cumulative effects on cultural resources in the region.

Conclusion

The actions called for in alternative C could have minor beneficial effects on the four national parks by offering increased community support of park management of cultural resources, but could also have minor adverse effects by affecting more trail segments within the parks.

Under alternative C, more trail segments on nonfederal lands could come under federal jurisdiction and management resulting in the potential either long-term moderate to major beneficial effects on resource protection or short term minor to major adverse effects if funds and staff are not available for monitoring and protection. As in alternative B, there would be potential long-term minor to moderate beneficial effects on the properties included on the auto tour. Research and information sharing could have a long-term beneficial impact by providing land owners along the trail with a model for preserving such resources and contributing to the broader preservation of the Hawaiian culture through public understanding.

Short and long-term beneficial effects on cultural resources would result from better options for redirection of trail users.

Long-term moderate to major beneficial effects on the Hawaiian community and on resource protection would result from local communities engaging in living and interpreting their culture along a traditional system of trails.

There would be no adverse impacts to NRHP properties associated with the Ala Kahakai NHT within the four national parks. Potential moderate to major benefits would accrue to Native Hawaiians engaged in living their traditional culture and interpreting it to the public. The actions taken under alternative C would provide moderate beneficial effects by best promoting the national recognition of the cultural significance of the Ala Kahakai NHT.

Incremental implementation of the plan as the NPS develops capacity within itself and its partners to complete segment management plans and to carry out inventory, management, and monitoring, would reduce the potential for adverse effects on cultural resources on the parts of the trail administered or managed by the NPS.

No impairment of resources on NPS lands is anticipated.

Effects on Cave Resources

Methodology and Assumptions

Caves include both cultural and natural resources, but are managed by the NPS under the Cultural Resource Program. Therefore, the impact intensity definitions are consistent with the definitions of adverse effect in 36 CFR 800. NEPA intensity thresholds for cultural resources are provided only within the no adverse effect category. For impacts of minor intensity, the thresholds address adverse or beneficial changes. The thresholds for moderate and major impacts only consider beneficial changes because unfavorable changes of these magnitudes would result in a Section 106 finding of adverse effect (see page 148). Once an adverse impact is identified, ways would be considered to avoid, minimize, or mitigate it.

Available information was obtained through relevant literature, best management practices, and consultation with the public and resource specialists. Impacts were assessed using best professional judgment and the following thresholds of change for the intensity of impacts:

Impact Intensity	Impact Description
Negligible	The effects on cave resources (natural and cultural) would be at the lowest levels of detection, barely measurable with neither adverse nor beneficial consequences. Impacts would neither alter resource conditions, such as traditional access or site preservation, nor the relationship between the resource and the affiliated group's body of practices and beliefs. The determination of effect for Section 106 would be *no adverse effect.*
Minor	An action would improve the maintenance and preservation of a cave's natural resources and its cultural patterns and features and would protect the integrity of location, design, setting, materials, workmanship and association. Site protection would enhance access to traditional resource areas or accommodate a group's traditional practices or beliefs. Minor impacts could be beneficial or adverse. For purposes of Section 106, the determination of effect would be *no adverse effect*.
Moderate	An action would noticeably enhance stabilization or preservation of a cave's natural resources and its cultural patterns and features and would protect the integrity of location, design, setting, materials, workmanship and association. Site protection would encourage traditional access or accommodate a group's practices or beliefs. The determination of effect for Section 106 would be *no adverse effect*.
Major	An action would substantially enhance stabilization or preservation of a cave's natural resources and its cultural patterns and features and would protect the integrity of location, design, setting, materials, workmanship and association and would facilitate traditional access or accommodate a group's practices or beliefs. The determination of effect for Section 106 of would be *no adverse effect*.

Effects on Cave Resources from Alternative A: No Action

Analysis

The importance of caves derives from their use as Native Hawaiian burial sites; their associations with Native Hawaiian spirituality; and the unique flora and fauna they may contain. Caves are important cultural, biological, geological, and educational resources. Any visitation (even by careful scientists) may damage delicate cave features and may also damage cave organisms or habitat. Heavy use by recreational visitors, even "ecotourists," to caves could take a toll on the geological features, biology, and cultural resources of many lava tube caves. Often there is a conflict between the wishes of many Native Hawaiians to exclude most visits and the growing demand of recreational users to explore more and more caves on a more frequent basis (County of Hawaii, 1995b). Caves that are not well protected have been looted or desecrated through misuse.

Under alternative A, cave management would continue under the Federal Cave Protection Act on NPS-owned lands—the four national parks. The NPS would initiate or continue inventory of non-burial caves within the parks, as possible. The *'ohana* (affiliated group) would be consulted. The caves would remain closed to the public until a determination could be made on appropriate use. If burials are present, the cave would be protected from public access. Nonburial caves would be closed until an inventory of cave resources and a protection and monitoring plan are completed. Both federal and state law allow that government information on the cave location and sensitive resources be kept confidential. Once the status of resources is known and safety hazards are assessed, caves may be classified for closure to the public, for research only, or for appropriate public use. It is not known at this time if caves within the national parks are near the route of the Ala Kahakai NHT.

Trail segments on non-federal lands would only become official components of the Ala Kahakai NHT through agreements with managing entities in consultation with the *'ohana* of the area. Caves on nonfederal lands would be under the authority of the Hawaii Cave Protection Act. That act requires the written permission of the landowner before caves can be entered and their resources affected. While state and county agencies might be moved to protect cave resources and consult with the *'ohana*, it is not clear that private landowners would have cave protection as a value. Since the trail through private lands is likely to be limited to a state-owned public right-of-way and a potential negotiated adjacent protected area, caves would most likely be on land outside of the trail area; but it is possible that their management could be influenced by the trail administration through agreements with adjacent landowners.

Because few segments would be incorporated into the Ala Kahakai NHT under this alternative, it is likely that few if any caves would be encountered on non-federal segments.

Cumulative Effects

Under alternative A, cave resources would be protected within the national parks. Few caves would be affected by those segments of trail included in the Ala Kahakai NHT. Impacts to caves due to trail use would be negligible.

Cumulative effects of projects like those in the cumulative impacts scenario could have either long-term major beneficial or adverse effects on cave resources. Although the Hawaii Cave Protection Act would apply to all caves on nonfederal lands, if caves remain open and unmonitored, damage to caves in nonfederal areas could occur as the number of cave enthusiasts with a variety of interests grows. The result could be short and long-term minor to major adverse effects. Burial caves on nonfederal lands could continue to be disturbed and even looted. Projects such as the Shores at Kohanaiki have destroyed lava tube caves in the process of

construction. Such actions cause long-term major adverse effects. Projects such as the proposed state park at Kīholo could have a long-term moderate to major beneficial effects on cave resources that are currently not well-protected if the state is able to fund protection.

Conclusion

The actions of alternative A would have negligible effect, neither adverse nor beneficial, on cave resources in national parks and on segments of trail included in the Ala Kahakai NHT. The anticipated determination for Section 106 would be no adverse impact. Use of caves on nonfederal lands for recreation could have minor to major adverse impacts on cave resources. Looting or desecration of caves would have major long-term adverse effects on cave resources.

There would no be impairment of cave resources on national park lands.

Effects on Cave Resources from Alternative B: Single Trail

Analysis

Under alternative B, federal administration of the trail would increase as trail segments are incorporated into the Ala Kahakai NHT. With a continuous linear trail, it is likely that caves would be located near some segments of the Ala Kahakai NHT. As with alternative A, the trail through private lands is likely to be limited to a state-owned public right-of-way and a potential negotiated adjacent protected area. Caves would most likely be on land outside of the trail area, but it is possible that their management could be influenced by agreements with adjacent landowners in consultation with the *'ohana*. Even though caves may not be immediately adjacent to the trail, the trail may come near enough to make a cave apparent to the trail user. Alternative B includes mitigations such as the potential to reroute the trail to avoid proximity to caves and trail user education. Cave protection would occur as in alternative A on federal lands and nonfederal lands. Cave inventories on private land would occur only with the landowners consent.

Cumulative Effects

Cumulative effects on cave resources from projects in the cumulative affects scenario and from the trail itself would be the same as alternative A.

Conclusion

The actions of alternative B would have negligible long-term effects on cave resources in national parks and along segments of trail included in the Ala Kahakai NHT. Mitigations would be intended to reduce adverse impact to the level of no adverse impact for purposes of Section 106. Use of caves on nonfederal lands for recreation could have long-term minor to major impacts on cave resources.

There would not be impairment of cave resources on national park lands.

Effects on Cave Resources from Alternative C: Ahupua'a Trail System

Analysis

Under alternative C, the area of affect includes not only a continuous linear trail and negotiated adjacent protected areas, but also a network of trails and their landscapes on public lands. It is likely that the trail may encompass caves and cave systems in some areas. Caves would be protected by federal and state laws as in alternatives A and B. Under alternative C, on public lands, resources of non-sacred caves would be inventoried and assessed and management and monitoring plans in place as trails are incorporated into the Ala Kahakai NHT. The *'ohana* would be consulted and involved in determining the value of each affected cave or cave system. Sacred caves would be inventoried but closed to the public unless access were permitted by the *'ohana*.

Alternative C's greater area of affect could offer more flexibility to assess the range of cave resource

values and to allow certain caves open to the public for educational and recreational purposes as part of the trail experience. Through trail interpretation, the public could better understand the role of caves in the Hawaiian culture. Information to the public would focus on the need to protect these fragile, unique resources.

Alternative C could provide a better opportunity than alternatives A and B to protect caves through active management and to balance people's desire to use caves for scientific, recreational, and educational activities with Hawaiian spiritual concerns. Opening certain caves to the public, while closing others, could meet people's desires to explore caves while protecting the most sensitive caves. On lands for which it is responsible and through management plans for nonfederal lands, the NPS would develop a responsible stewardship program to better protect caves.

Alternative C relies on NPS oversight of community-based management that includes '*ohana* to protect and manage resources such as caves. This approach holds promise to provide the most sensitive and appropriate management of cave and trail resources. The trail administration would work with the public land manager to sustain protection of cave resources in the case that the community could not sustain its stewardship.

Cumulative Effects

Unlike alternatives A and B, alternative C has the potential to include within trail management caves and cave systems on public lands or private lands on which the owner shows an interest. The protection and interpretation of caves through community-based management could provide long-term minor to moderate beneficial effects on cave resources. On the other hand, if the community-based management is unsuccessful, there could be minor to moderate adverse effects on cave resources. The effects on cave resources due to the Ala Kahakai NHT would be minor compared to the potential for damage to cave resources by the development projects in the cumulative impacts scenario that could cause moderate to major long-term adverse impact to cave resources.

Conclusion

Under alternative C, effects to cave resources would be negligible on federal lands incorporated into the Ala Kahakai NHT. Mitigations would be intended to reduce adverse impact to the level of no adverse impact for purposes of Section 106. Moderate long-term beneficial effects would occur if the public becomes better educated about the fragility and uniqueness of cave resources and, therefore, is moved to protect them. Moderate to major beneficial effects could result from the protection of cave resources along official components of the trail. Cave resources on nonfederal lands may be subject to long-term minor to major adverse effect. Looting and desecration of caves would have long-term major effects on cave resources.

No impairment of cave resources on NPS lands is anticipated.

Effects on Wetlands (Anchialine Pools and Fishponds)

Methodology and Assumptions

Completion of the Queen Ka'ahumanu Highway in 1975 opened access to coastal resources which were formerly quite inaccessible. The Ala Kahakai NHT could have a similar but lesser effect on anchialine pools currently inaccessible areas. Generally these pools are used by recreationists for fishing, swimming, and bathing. Fishing may directly impact some native fish species found in anchialine systems (Brock, 1985:13). Anchialine pools have been used for bathing by campers or refreshing stops by hikers for a long time. Ancient Hawaiians modified pools with stone walls for bathing. No known negative impacts are attributable to these activities.

The use of shampoos and soaps could have an effect on biota in the pools, but there is no

evidence for it (Brock, 1985:13). Also, human use could introduce contamination by fecal and coliform bacteria. The trail could provide access for dumping of rubbish into pools, an activity that has gone on for over 100 years. Bottles and cans appear to have no short-term negative impact on the fauna, but dumping of substances such as used oil, grease, and oil filters caused the disappearance of *ʻōpaeʻula* in a pool adjacent to Honokōhau Harbor (Brock, 1985:13). The single most important factor indicating the health of an anchialine pool is the visible presence of red shrimp, *ʻōpaeʻula* (Brock, 2005).

Development of the Ala Kahakai NHT under all alternatives will not result in the loss of anchialine pools. Since 1985, after the Waikoloa Resort filled about 70% of the pools on its property, the development permit process has not allowed the destruction of pools. Ponds can be created as has been done at Hualalai Resort where 3 acres of ponds were created as visual amenities (Chai). However, use of the trail could affect the health of the pools. Trail users—through overuse of the pools, introducing alien fishes or coliform bacteria, bathing using soaps and shampoos, swimming with suntan lotion applied, dumping of trash—could affect anchialine pool resources. However, with 95% of the pools along the Kona coast having an alien fish problem (Brock, 2005), it is difficult to estimate without information on specific pools just what effect trail use or trail management might have, either positive or negative.

Information was obtained through relevant literature, best management practices, and consultation with experts and resource managers. Impacts were assessed using best professional judgement and the following thresholds of change for the intensity of impacts on wetlands (anchialine pools and fishponds):

Impact Intensity	Impact Description
Negligible	The impact on anchialine pools and fishponds would not be measurable. The abundance or distribution of red shrimp for anchialine pools or native fish for fishponds along the trail route would not be affected or would be slightly affected. Ecological processes and biological productivity would not be affected.
Minor	An action would not necessarily decrease or increase the anchialine pool's and fishpond's ecological balance. The action could affect the abundance or distribution of individuals in a localized area but would not affect the viability of local or regional populations or communities.
Moderate	**Adverse impact** — an action would result in a change in abundance or distribution of red shrimp (for anchialine pools) or native fish (for fishponds) in a single anchialine pool or fishpond and would affect the local population sufficiently to cause a change in abundance or distribution. It would not affect the viability of the regional population or communities. **Beneficial impact** — an action would result in a change in abundance or distribution of red shrimp for anchialine pools or native fish for fishponds in a single anchialine pool or fishpond and would affect the local populations sufficiently to return them to sustainable levels.
Major	**Adverse impact** —an action would result in change to several anchialine pools or fishponds that would affect a regional or local population of key species sufficiently to cause a change in abundance or in distribution to the extent that the population or communities would not be likely to return to former levels **Beneficial impact** —an action would result in change to several anchialine pools or fishponds that would affect a regional or local population of key species sufficiently to cause a change in abundance or in distribution to the extent that the population or communities would return to sustainable levels

Effects on Anchialine Pools and Fishponds from Alternative A: No Action

Analysis

Under alternative A, which would continue current conditions, pools within the four national parks would continue to be inventoried and monitored as possible. On nonfederal land, it is unlikely that pools would be included in direct trail management because only the tread and negotiated adjacent protected areas would be included in NPS administration and oversight. Trail segment management planning could encourage inventory and monitoring of pools adjacent to or within view of the trail. Pools would be protected by keeping trail users on the trail and through interpretive signs and other forms of education. If trail users stray from the trail and ignore educational messages, they could adversely affect anchialine pools and fishponds near the Ala Kahakai NHT on nonfederal lands.

It is probable that pools within the trail corridor, irrespective of trail use, would continue to degrade unless new methods for exterminating non-native fish are developed or rotenone[50] is approved for use in anchialine pools. In addition, fertilizers and pesticides used in resort developments can have an adverse impact on pools and fishponds. Sections of the *ala loa* that are not included in the Ala Kahakai NHT would continue to be used in an unregulated fashion by fishers and other recreational users to access nearshore resources. These users could inadvertently harm the pools through introduction of alien fish or substances such as shampoos, tanning oils, and soaps. Continuing present use could have minor to major adverse impacts on pools within the Ala Kahakai NHT corridor.

Cumulative Effects

Under alternative A, impacts to anchialine pools and fish ponds on national park lands would be negligible, neither adverse nor beneficial. However, high value pools on nonfederal lands within the Ala Kahakai NHT corridor have degraded over the years and would continue to do so under alternative A. Continuing growth in the county and the subsequent development that occurs would continue to affect the health of anchialine pools within the trail corridor. It is anticipated that the projects included in cumulative impacts scenario would have short to long-term minor to major adverse impacts to the health of anchialine pools and fishponds.

"Queen's Bath," Kaloko-Honokohau NHP, N. Kona, NPS photo

Conclusion

Under alternative A, trail use would have negligible effects on anchialine pools and fishponds on national park lands. Inventory and monitoring of pools adjacent to the trail along with educational messages to users could make some small contribution to reducing potential adverse effects. The potential long-term adverse effect on pools along trail segments not included in the Ala Kahakai NHT would continue. Continuing growth in the county and the subsequent development that occurs may have long-term negative impacts on anchialine pools, although projects proposed in state parks could result in moderate beneficial effects.

No impairment of anchialine pool and fishpond resources as a result of use of the Ala Kahakai NHT on NPS lands is anticipated.

[50] Considered an organic insecticide because it is made from the roots of tropical legumes, rotenone is toxic to the fish but not the shrimp in anchialine pools. It can also be toxic to aquatic animals, birds, and some mammals. Its use in water is now outlawed by the Environmental Protection Agency.

Effects on Anchialine Pools and Fishponds from Alternative B: Single Trail

Analysis

Under alternative B, a continuous linear trail would be completed. As in alternative A, pools within the four national parks would continue to be inventoried and monitored as possible. Increased recreational activity along the trail could expose more pools to impacts. Because on nonfederal lands the trail would consist of the tread and negotiated adjacent protected areas, the management approach for anchialine pools would be similar to alternative A, only more pools would be affected. Even though more visitors would be attracted to the trail, with added measures to keep users on the trail and to educate the public, the pools along the national trail would be more likely to be protected than they are now.

Cumulative Effects

Effects on anchialine pools would be the same as alternative A. Overall, the cumulative projects would have minor to major long-term adverse effects on anchialine pools although projects proposed in the state parks could result in moderate beneficial effects to the pools.

Conclusion

If effective measures are implemented through trail management, alternative B offers some small potential to reduce adverse impacts to high value anchialine pools that occur near the linear route of the trail. Pool resources that are not incorporated into the Ala Kahakai NHT and not protected in other ways would continue to experience adverse impacts to varying degrees.

No impairment of anchialine pool and fishpond resources on NPS lands as a result of use of the Ala Kahakai NHT is anticipated.

Effects on Anchialine Pools and Fishponds from Alternative C: Ahupua'a Trail System

Analysis

Alternative C includes not only a linear trail but also areas on public lands that encompass a network of trails and their landscape. As in alternatives A and B, pools within the four national parks would continue to be inventoried and monitored as possible.

With alternative C, pools and pool systems on public lands would come within the purview of trail administration and management. This alternative would provide the opportunity to select high value pools to protect by avoidance and those to protect through interpretation. High value pools and ponds would be protected and maintained as possible with healthy populations of red shrimp or native fish. Pools that are already invaded by non-native fish would be stabilized, as possible. In addition, the relationship of the pools to the underground water and the sea could be better studied and evaluated. To avoid adverse impacts to the pools, the NPS would need to have the capacity to ensure that management is available to protect pools associated with the trail on public lands.

Cumulative Effects

Effects would be similar to alternatives A and B; however, under alternative C the potential would exist to actually manage pools and protect high value pools.

Effects from the cumulative projects outside of the national and state parks would likely have a long-term minor to major adverse impact on pools.

Conclusion

If effective measures are implemented through trail segment management plans, this alternative offers some potential to reduce adverse impacts to high value anchialine associated with a system of trails on public lands and to stabilize those pools already invaded by non-native fish. These actions would provide minor to moderate

beneficial effects. Pool resources that are not incorporated into the Ala Kahakai NHT and not protected in other ways would continue to experience minor to major adverse impacts.

No impairment of anchialine pool and fishpond resources as a result of use of the Ala Kahakai NHT on NPS lands is anticipated.

Effects on Marine Resources Related to Traditional Coastal Harvesting

Methodology and Assumptions

Commercial collection of marine ornamental species, the major adverse impact to the abundance of reef fishes and nearshore resources such as '*opihi* and *'a'ama* crab, is not related to trail use. This issue is being addressed by local communities and the DLNR Division of Aquatic Resources through Fishery Management Area plans. However, increased use of traditional fisher trails as some become linked to the Ala Kahakai NHT would bring more people to the shoreline to enjoy and perhaps exploit nearshore and reef resources. Uses such as swimming, snorkeling, and photographing could have moderate to major effects on the resources due to potential trampling of coral. It is possible that trail users could diminish reef fish or nearshore resources through recreational harvesting or overuse. These impacts would be felt most keenly by subsistence fishers and gatherers.

Information was obtained through relevant literature, best management practices, and consultation with experts and resource managers. Impacts were assessed using best professional judgment and the following criteria to define impact intensities as follows:

Impact Intensity	Impact Description
Negligible	Effects on marine resources related to traditional coastal harvesting would not be measurable. The abundance or distribution of individuals would not be affected or would be slightly affected.
Minor	Effects on marine resources related to traditional coastal harvesting would be detectable, but localized, small, and of little consequence to the species' population. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
Moderate	Effects on marine resources related to traditional coastal harvesting would be readily detectable but localized, with consequence at the population level. Mitigations measures, if needed to offset adverse effects, and would be extensive and likely successful.
Major	Effects would be obvious and would have substantial consequences to marine resources related to traditional coastal harvesting at the regional level. The change could result in a severely adverse or major beneficial impact, and possible permanent consequence upon the species. Extensive mitigation measures would be needed to offset any adverse effects, and their success would not be guaranteed.

Effects on Traditional Coastal Harvesting Resources from Alternative A: No Action

Analysis

Reef fishes and nearshore resources will continue to be protected within the national parks and by local residents, traditional users, and DLNR Division of Aquatic Resources through Fishery Management Areas (FMAs).

Traditional fishers and gatherers would be consulted as trail segment management plans are developed. Information could also be gathered as part of ethnographic research. Recommendations developed for Fishery Management Areas (FMAs) could be applied to traditional fishing and gathering areas where they occur along the length of the trail. Trail signs, interpretive media, and promotional materials would convey the limitations on fishing and gathering and encourage appropriate activities.

Those people who use trails to access the shoreline may continue to harvest fish and nearshore resources in areas that are traditional *ko'a* (fishing grounds) or gathering areas outside of the FMAs. Under alternative A, baseline data would need to be gathered to establish the abundance and diversity of the existing nearshore and reef areas in order to determine the extent of impacts, if any, in areas accessed by trail segments incorporated into the Ala Kahakai NHT where local fishers have expressed concerns. Once a baseline is established, then a monitoring program related to trail use could determine the significance of the impacts.

Locally significant adverse impacts could possibly occur in nonfederal areas within the trail corridor that are not incorporated into the Ala Kahakai NHT, but due to Fishery Management Area plans, would not be expected to do so.

Cumulative Effects

No changes to coastal harvesting resources due to the Ala Kahakai NHT would be expected due to the actions of alternative A. Cumulative projects could have adverse effects on local fisheries, especially Kona Kai Ola, the expansion of the small boat Harbor at Honokōhau, and the Superferry, if it brings more fishers to the Kona coast. The Ala Kahakai NHT would contribute little to this effect.

Conclusion

Under alternative A, it is anticipated that the effects on traditional coastal harvesting resources would be negligible, neither adverse nor beneficial.

No impairment of marine resources related to traditional gathering in NPS areas is anticipated.

Effects on Traditional Coastal Harvesting Resources from Alternative B: Single Trail

Analysis

Under alternative B, traditional fishers and gatherers would be consulted as trail segment management plans are developed. Information could also be gathered as part of an ethnography program. Recommendations developed for Fishery Management Areas (FMAs) could be applied to traditional fishing and gathering areas where they occur along the length of the trail. Trail signs, interpretive media, and promotional materials would convey the limitations on fishing and gathering and encourage appropriate activities.

Cumulative Effects

Completion of the linear trail for the Ala Kahakai NHT may provide some additional access to fisher trails and coastal resources. Information to users should encourage appropriate activities. Affects on traditional coastal harvesting would be expected to be minor due to actions of alternative B. Effects of the cumulative projects could be minor to moderate, but requirements of the FMAs would likely be successful in protecting local fishers.

Conclusion

Coordination with State DLNR and consultation with local traditional users to avoid local impacts

would have minor beneficial effects. Impacts due to use of the Ala Kahakai NHT are expected to be negligible.

No impairment of marine resources related to traditional gathering in NPS areas is anticipated.

Effects on Traditional Coastal Harvesting from Alternative C: Ahupua'a Trail System

Analysis

Completion of the ahupua'a trail system for the Ala Kahakai NHT would provide some additional access to fisher trails and coastal resources for traditional gatherers and other visitors. Mitigations in alternative C would be similar to alternatives B. Alternative C emphasizes teaching and practicing protocols related to social and environmental behavior that reflect Hawaiian values.

Education of users is expected to encourage appropriate activities. The actions are anticipated to provide negligible minor to beneficial impacts to coastal resources related to traditional harvesting.

Cumulative Impacts

Cumulative effects to marine resources related to traditional harvesting would be the same as described under alternative B.

Conclusion

The *ahupua'a* trail system and the local community management approach of alternative C would provide negligible to minor beneficial impacts to coastal resources related to traditional harvesting.

No impairment of marine resources related to traditional gathering in NPS areas is anticipated.

Effects on Native Ecosystems: Vegetation and Wildlife

Methodology and Assumptions

Few studies have been completed on the effects of recreational trail use on vegetation in Hawai'i. The impacts discussion is based on assumptions from studies conducted in other ecosystems. It is generally agreed that the primary disturbance to vegetation by human recreational activities is direct trampling or reduction of growth due to soil compaction (Josselyn *et al.*). Also, trail users can spread non-native invasive species.

No studies have been completed specifically regarding the impacts of recreational trail use on Hawaiian wildlife. In determining management actions and potential mitigations for a programmatic environmental impact statement such as this, trail use impact must be extrapolated from studies completed in other ecological areas.

Impacts of recreational trail use to wildlife are varied, hard to assess, and often species specific. All wildlife seem to respond in some way to human activities, but the acuteness and duration of response varies with life-cycle stage and species. Responses can range from a brief flight and return to desertion of the area with no return. The long-term effects of repeated disturbance range from an increase in the population of one or more species tolerant of human activities to the extirpation of one or more populations. Short-term effects have been better studied than long-term.

Abundant evidence exists that humans disturb nesting birds (Trulio, personal communication). One study concludes that foraging shorebirds will flush if they are directly approached by humans, but there are no long-term effects of this action (Yasue quoted by Trulio, personal conversation). A recent study around San Francisco Bay suggests that tangential trails, those parallel to the foraging area, did not have an overall effect on foraging shorebirds (Trulio *et al.* 2006). A trail

that approaches a foraging area, such as a trail to an overlook, would affect only the nearby shorebirds. Other factors such as habitat quality or predation risk may be more important than trail use to bird presence (Trulio *et al.* 2006).

On the other hand, waterfowl—ducks and geese—definitely move away from trails, and thus, access to their habitat can be compromised (Trulio, personal conversation). For instance, a loop trail around a lake or pond could separate waterfowl from their habitat.

Josselyn *et al.* found that disturbances to waterfowl and large birds, such as herons and egrets, occurred at ranges of 75 to 175 feet (23 to 53 meters) in the absence of physical buffers while Taylor found that flushing happens within 100 meters (328 feet). Barriers such as high vegetation or channels may reduce these distances.

A study completed in pine forest and mixed grass prairie ecosystem found elevated rates of nest predation near trails (Knight). It was unclear if the effect came from the physical presence of the trail or from associated human disturbance. The study noted that predators are attracted to narrow, open corridors. Knight concluded that trails affect the distribution, abundance, and reproductive success of bird species is those particular habitats. On the other hand, he found that trail placement and user management and education can be effective in mitigating the negative effects of trails. Taylor, too, concludes that user education could be a valuable tool in protecting wildlife from disturbance. He interviewed trail users and found that they do not recognize their impacts on wildlife and that they felt it acceptable to approach wildlife more closely than the wildlife would allow.

These studies suggest that the issues of vegetation and wildlife must be addressed in trail management plans prepared as specific trail segments are added to the Ala Kahakai NHT. The goal of trail management under all alternatives would be to have as little adverse effect on native vegetation and wildlife as possible, protecting native populations from harvest, harassment, or harm by human activities associated with trail use.

Information was obtained through relevant literature, best management practices, and consultation with experts and resource managers. Defining potential impacts from management actions is based on professional judgment and experience with similar actions in other areas. The following criteria define impact intensities as follows:

Impact Intensity	Impact Description
Negligible	The effects on native ecosystems (vegetation and wildlife) would not be measurable. The abundance or distribution of individuals would not be affected or would be slightly affected. Ecological processes and biological productivity would not be affected.
Minor	The effects on native ecosystems (vegetation and wildlife) would be detectable, but localized, small, and of little consequence to the species' populations. Ecological processes and biological productivity would not be affected. Mitigation measures, if needed to offset adverse effects, would be simple and successful.
Moderate	Effects on native ecosystems (vegetation and wildlife) would be readily detectable but localized, with consequence at the population level. Changes to ecological processes would be of limited extent. Mitigations measures, if needed to offset adverse effects, and would be extensive and likely successful.
Major	Effects on native ecosystems (vegetation and wildlife) would be obvious and would have substantial consequences for vegetation or wildlife populations at the regional level. Populations could be affected to the extent that they would not be likely to return to their former levels (adverse) or would return to sustainable levels (beneficial).

Effects on Native Ecosystems from Alternative A: No Action

Analysis

Actions in alternative A would affect the trail within the four national parks and a few segments of trail on nonfederal land added to the Ala Kahakai NHT. Trail management would contribute as possible in the national parks to the overall goal of protecting and perpetuating native vegetation and wildlife as part of the natural ecosystem. On nonfederal lands, trail management would have limited opportunities to meaningfully protect vegetation and wildlife due to the small area of direct effect; however, education of trail users can contribute to indirect minor beneficial effects.

Vegetation

Many nonnative species occur in well-established populations within the trail corridor, and trail users could increase the migration of noxious and invasive weeds into the national parks by using connecting trails not necessarily part of the Ala Kahakai NHT. Off-trail trampling within the trail corridor could effect native species and spread nonnative species, but under alternative A, little of this effect would be attributable to use of the national trail itself. Trail management proposals include the removal of non-native species from the trail and buffers and planting of native species, as appropriate. Enforcing the requirement for users to stay on trails would help minimize the effects of trampling and soil compaction.

Wildlife

Under alternative A, effects on wildlife would generally occur as they do now. Wildlife would be protected within the national parks. Use of the Ala Kahakai NHT would be expected to occur in mostly urbanized areas in which sensitive wildlife may already have been displaced. Use of the national trail could have minor short-term adverse impacts, but is expected to have negligible long-term impacts.

Cumulative Effects

Under alternative A, negligible beneficial effects to native plant populations could result from removal of alien species and planting of natives within the trail right-of-way and negotiated adjacent protected areas. Minor short-term adverse effects on wildlife and negligible long-term effects are expected.

Cumulative projects would have a moderate to major, adverse, short and long-term effects on native ecosystems, both vegetation and wildlife resources, within the region. Most of the projects outside of the state parks in the cumulative projects scenario will result in the loss of plants, wildlife, and habitat. Increased development will further segment or marginalize the native natural areas. Some projects will decrease corridors for species migration and habitation. Activities affecting vegetation outside of the trail area on nonfederal lands could negatively affect vegetation resources along the trail and in the region.

Conclusion

Direct effects from the actions of alternative A would be negligible on native ecosystems. Cumulative projects would have a moderate to major adverse long-term effect on vegetation and wildlife making up native ecosystems; the Ala Kahakai NHT would contribute little to this cumulative effect.

No impairment of native ecosystems on NPS lands is anticipated.

Effects on Native Ecosystems from Alternative B: Single Trail

Analysis

Actions in alternative B would affect the trail within the four national parks and a continuous linear trail on nonfederal land added to the Ala Kahakai NHT. Trail administration and management would have a direct effect on only the trail right-of-way and any negotiated adjacent protected areas negotiated with adjacent public and private landowners. Indirect effects would occur on lands adjacent to the trail.

Vegetation

Implementing the requirement for alien plant removal and planting of natives incorporated into the management plans for trail segments would provide minor short-term adverse effects but minor long-term benefits to native vegetation. Enforcing the requirement for users to stay on trails would help minimize the effects of trampling and soil compaction.

Wildlife

Trail management would contribute as possible in the national parks to the overall goal of protecting and perpetuating native wildlife as part of the natural ecosystem. On nonfederal lands, trail management would have limited opportunities to meaningfully protect wildlife due to the small area of direct effect; however, consideration of trail location, temporary closures during nesting seasons, removal of predators, education of trail users and other measures would contribute to direct and indirect minor beneficial effects.

Cumulative Effects

Cumulative impacts would be the same as alternative A.

Conclusion

Implementing the requirement for alien plant removal and planting of natives incorporated into the management plans for trail segments would provide minor short-term adverse effects but minor long-term benefits to native vegetation. Consideration of trail location, temporary closures during nesting seasons, removal of predators, education of trail users and other measures would contribute to direct and indirect minor beneficial effects.

Cumulative projects would have a moderate to major, adverse, long-term effect on vegetation and wildlife making up native ecosystems; the Ala Kahakai NHT would contribute little to this cumulative effect.

No impairment of native ecosystems on NPS lands is anticipated.

Effects on Native Ecosystems from Alternative C: Ahupua'a Trail System

Analysis

Alternative C would affect a continuous linear trail and an *ahupua'a* system of trails on federal, state, and county public lands. Across private lands, trail administration and management would have direct effect on the linear trail right-of-way and any negotiated adjacent protected areas negotiated with adjacent landowners; on public lands, it would have direct effect on the landscapes associated with a traditional system of trails.

Vegetation

Implementing the requirement for alien plant removal and planting of natives incorporated into the management plans for trail segments crossing private lands would provide minor short-term adverse effects but minor long-term benefits to native vegetation. Implementing this requirement on public lands incorporated into the Ala Kahakai NHT would have moderate beneficial effects on native vegetation. Enforcing the requirement for users to stay on trails would help minimize the effects of trampling and soil compaction.

Wildlife

Trail management would contribute as possible in the national parks to the overall goal of protecting and perpetuating native wildlife as part of the natural ecosystem. On private lands, trail management would have limited opportunities to meaningfully protect wildlife due to the small area of direct effect; however, consideration of trail location, temporary closures during nesting seasons, removal of predators, education of trail users and other measures would contribute to direct and indirect minor beneficial effects. The *ahupua'a* trail system approach on public lands provides flexibility in selecting trails for seasonal use to protect nesting wildlife and the opportunity to positively affect wildlife habitat through NPS collaboration with state land managers in habitat management resulting in moderate to major beneficial effects on wildlife habitat on public lands. Although

alternative C provides the opportunity for loop trails, care would be taken to avoid loop trails around fish ponds or in other areas that might separate wildlife from their habitat.

Cumulative Effects

Cumulative impacts would be the same as alternative A.

Conclusion

Implementing the actions of alternative C would have short-term minor adverse effects on vegetation and wildlife but long-term moderate to major beneficial effects. Cumulative projects would have a moderate to major, adverse, long-term effect on vegetation and wildlife making up native ecosystems; the Ala Kahakai NHT would contribute a minor beneficial effect.

No impairment of native ecosystems on NPS lands is anticipated.

Effects on Special Status Species[51]

Methodology and Assumptions

Threats to special status plants from increased use include trampling off the trail, human-aided distribution of alien species, increased risk of fire, and contamination of water or soil by human waste. Garbage left uncovered could attract rats and mongooses who then might chew on endangered plants and their seeds. The nesting sites of endangered animal species could be disturbed by simple human presence or by human activity such as camping. Examples of species along the trail that could be affected are endemic stilt and coot that nest at Aimakapā Fish Pond, which is also host to many rare and migrating birds, and the hawksbill turtle which nests only at Kamehame on Hawai'i Island. Habitats of endangered invertebrates can be lost as anchialine ponds are overtaken by alien fish, overused, or polluted from dumping. Although very limited in scope, facility development at specific sites along the trail could temporarily displace or disturb endangered species.

Some information regarding special status species and trail use is available from the Appalachian National Scenic Trail (AT) which has developed a natural heritage monitoring program to track the status of an identified 2,050 occurrences of rare, threatened, or endangered (RTE) species along the 2160-mile route. The 88% RTE species occurrences are plants and 12% animals. The most frequent threats to plants are trampling, trail maintenance, exotic plants, and exotic insect pests. Recommended management actions include rerouting the trail, controlling exotic species, removing competing species, controlling erosion, and use of signs to educate users. Monitoring workshops have trained volunteers to monitor rare, threatened, and endangered plants, animals, and communities within the AT corridor. The success rate of volunteer monitoring program is high after a workshop, but declines over time (Schwarzkopf: 6).

Informing volunteer maintenance groups of the presence, identification, and location of RTE species has shown to prevent inadvertent harm to these species during trail maintenance activities. Training, including rare plant identification sheets and details on how to avoid harming these plants, led to substantially fewer occurrences of damage to RTE species (Schwartzkopf: 7).

Owen and Elkinton note that for the most part "national trails are too narrow or have too small a land base to afford significant protection for rare natural communities or sensitive plant or animal species, independent of surrounding protected lands (Owen: 5). On the other hand, they note that "studies conducted along the Appalachian National Scenic Trail… have shown that when a trail's protective corridor is wide enough, it can provide significant habitat benefits for many types of fauna and flora" (Owen: 4).

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[51] This evaluation includes rare, threatened, and endangered species listed by the U.S. Fish and Wildlife Service and listed and candidate species and species of concern named by the Hawaii Natural Heritage Program. See Appendix D for lists of these species.

Information was obtained through relevant literature, best management practices, and consultation with experts and resource managers. The analysis is qualitative rather than quantitative due to the lack of specific information about the treatment of special status Hawaiian species on nonfederal lands. Impacts were assessed using best professional judgment and the following criteria to define impact intensities:

Monk Seal, NPS photo

Impact Intensity	Impact Description
Negligible	The action would have no measurable effect to a listed species, suitable, potential, or critical habitat, resulting in a no effect determination. There would be no measurable effect to species of concern.
Minor	The effects would be discountable (extremely unlikely to occur), insignificant (not able to be meaningfully measured, detected, or evaluated), or completely beneficial for special status species. Any change would be small and localized and of little consequence, and result in a *not likely to adversely affect* determination and require informal consultation with the U.S. Fish and Wildlife Service for rare, threatened, and endangered (RTE) species.
Moderate	The action would result in some change to a population or individual of a species or designated critical habitat for sensitive species. The change would be measurable and of consequence but would most likely result in a *not likely to adversely affect* determination and require informal consultation with the U.S. Fish and Wildlife Service for RTE species.
Major	The action would result in a noticeable change to a population or individual of a species or designated critical habit for special status species. Any adverse effect to the species that may occur as a direct or indirect result of the alternative and the effect is not discountable, insignificant, or completely beneficial. Incidental take is anticipated to occur as a result of the action. The change would result in a *likely to adversely affect* determination and would require formal consultation with the U.S. Fish and Wildlife Service for RTE species.

Effects on Special Status Species from Alternative A: No Action

Analysis

Under alternative A, within the national parks, the beneficial effects from the protection of special status species and their habitat within the parks would continue. An effort would be made to inventory special status species along the trail within the parks. In cases where an endangered species appears to be declining as with the stilt at Aimakapā Fish Pond, trail administration would cooperate with park resource managers to ensure that trail use is not contributing to the effect. Negligible effects are anticipated to special status species on federal lands due to trail use.

Under alternative A, few nonfederal trail segments would be added to the Ala Kahakai NHT. When they are added, plant and animal inventories along the immediate trail segment would be conducted to determine if special status species are present. Through consultation with resource experts, early consideration in planning, and coordination with trail managing entities, trail development would be planned to avoid adverse impacts to special status species to the greatest extent possible.

Management measures to prevent adverse impacts would include avoidance of nesting sites or other key areas, limitation of trail use during breeding seasons, user education, encouragement of users to stay on the trail to

avoid plant trampling, or other appropriate measures. Minor benefits to native plant populations would result from removal of alien species and planting of natives within the immediate area of the trail. Given the proposed planning and mitigation measures and the limited number of national trail segments available to the public, negligible to minor short and long-term, neither adverse nor beneficial, impacts are anticipated to special status species on nonfederal lands included in the NHT.

Use of existing trails that are not yet included in the Ala Kahakai NHT would continue to occur and could potentially adversely affect special status species. State laws for protection of special status plant and animal species would continue to apply within the entire trail corridor on nonfederal lands and would reduce the degree of impacts.

Cumulative Effects

Extensive disturbance and reduction of native habitats has caused the extinction of many native Hawaiian species and has placed in peril most of those that remain. Many projects listed in the cumulative impacts scenario have potential for direct and indirect, short and long-term, moderate to major adverse effects on special status species. Development in the state parks has potential to protect special status species if mitigation measures are put in place. Since planning is not complete for these parks, damage to special status species could continue, depending upon the application of state environmental laws. Alternative A's contribution to these impacts would be small and potentially beneficial. Impacts to special status species in NPS parks would be negligible, neither adverse nor beneficial, and nonfederal land incorporated into the Ala Kahakai NHT could have a minor, long-term beneficial effect.

Impacts to special status species on nonfederal land not incorporated into the Ala Kahakai NHT would continue to occur as they do now.

Conclusion

Although short-term minor effects to special status species may occur, no long-term adverse impacts from trail use on federal lands or along trail segments included in the Ala Kahakai NHT would occur under alternative A. Minor benefits to native plant populations would result from removal of alien species and planting of natives within the immediate area of the trail. Along trail segments not incorporated into the national trail, the potential for adverse impacts would continue, but would be mitigated by enforcement of state laws.

Along trail segments not incorporated into the national trail, the potential for adverse impacts would continue, but would be mitigated by enforcement of state laws.

No impairment to special status species in NPS areas is anticipated.

Effects on Special Status Species from Alternative B: Single Trail

Analysis

Impacts to special status species in the national parks would be similar to alternative A; however, the potential increase in use facilitated by the continuous linear trail proposed in alternative B could create additional pressure on special status species within the national parks and on nonfederal lands. Inventory of species and monitoring of trail use for localized effects of trampling, disturbance of nesting sites, distribution of nonnative species, and other potential effects would help ensure that, while special status species might suffer short-term minor adverse effects, they do not suffer long-term adverse effects.

Planning and mitigation measures for trail segments on nonfederal lands would occur as in alternative A, but more trail segments would be brought under the administration and oversight of the NPS. The area over which trail administration would have influence would be

the linear trail right-of-way and a possible negotiated adjacent protected area as defined in each trail segment management plan. Trail use could affect areas outside of the negotiated adjacent protected area that would need to be considered in planning. The NPS would work closely with the state on state lands, and all special status species would be considered and protection measures put in place in trail segment management plans. Segment management planning would include adjacent landowners or land managers to solicit their help in protecting special status species. Short-term minor adverse effects and long-term minor beneficial effects are expected to accrue to special status species.

As trail and site development occur and site-specific surveys identify species which have been listed or proposed by the US Fish and Wildlife Service (USFWS), the NPS would contact the USFWS to initiate consultation under Section 7 of the Federal Endangered Species Act of 1973, as amended (Act). Potential adverse impacts to listed species would be eliminated or reduced to a level of insignificance through such actions as trail relocation, seasonal closings, or other measures in compliance with the provisions of the Act for a determination of *not likely to adversely affect*.

State and county laws would continue to apply on nonfederal lands.

Cumulative Effects

Cumulative impacts would be the same as alternative A.

Conclusion

Impacts from trail use to special status species on federal lands would be negligible, neither adverse nor beneficial. Impacts from trail use along segments included in the Ala Kahakai NHT would be expected to be minor short-term adverse effects and long-term minor beneficial effects. Along trail segments not incorporated into the national trail, the potential for adverse impacts would continue, but would be mitigated by enforcement of state laws. Cumulative effects would be moderate to major and adverse; the contribution of alternative B to these effects would be negligible.

No impairment in NPS areas is anticipated.

Effects on Special Species from Alternative C: Ahupua'a Trail System

Analysis

The concept of alternative C includes the protection of native ecosystems, plants, and animals to provide the setting to teach and practice protocols of social and environmental behavior that reflect Hawaiian values. Under alternative C, within the national parks special status species would continue to be protected and the beneficial effects from the protection of and their habitat within the parks would continue. With the inclusion of *mauka-makai* trails and other coastal trails, more park land would be included in the area of affect and more visitors could come to the park with the intent of using the Ala Kahakai NHT. This wider protection area could benefit special status species. "Studies conducted along the Appalachian National Scenic Trail… have shown that when a trail's protective corridor is wide enough, it can prove significant habitat benefits for many types of fauna and flora" (Owen: 4).

Alternative C includes not only a continuous linear trail but areas on public lands, mostly state parks, that encompass a network of trails and their landscapes. The area of influence of trail administration on trails crossing private lands would include only the linear trail right-of-way and a possible negotiated adjacent protected area as defined in the trail segment management plan, as in alternative B. The area of influence on public lands would be the linear trail and the area encompassing a traditional network of trails. This broader scope provides the potential to affect plant and animal habitat rather than only specific species that might be found along a linear trail as with alternatives A and B.

Trail administration and the Ala Kahakai Trail Association would work with national park staff to help ensure that special status species are protected and the public educated about them. Mitigation to prevent adverse impacts could include avoidance of nesting sites or other key areas, limitation of trail use during breeding seasons, encouragement of users to stay on the trails to avoid plant trampling, user education, or other appropriate measures.

Monitoring of trail use within the national parks for localized effects of trampling, disturbance of nesting sites, distribution of nonnative species, and other potential effects would help ensure that, while special status species might suffer localized short-term minor adverse effects, they do not suffer long-term adverse effects.

Management plans would be prepared for all trail areas on public lands. All special status species would be considered and protection measures put in place in these management plans, including monitoring protocols to evaluate the health of special status plant and animal species over time. Mitigation measures would be applied on nonfederal public lands as on national park lands. Alternative C provides flexibility of trail location to avoid adverse impacts and more capacity to consider habitat and plant community conservation

As trail and site development occur and site-specific surveys identify species which have been listed or proposed by the US Fish and Wildlife Service (USFWS), the NPS would contact the USFWS to initiate consultation under Section 7 of the Federal Endangered Species Act of 1973, as amended (Act). Potential adverse impacts to listed species would be eliminated or reduced to a level of insignificance in compliance with the provisions of the Act.

State and county laws would continue to apply on nonfederal lands.

Cumulative Effects

Cumulative impacts would be expected to be similar to alternatives A and B.

Conclusion

There should be no long-term adverse effects to special status plant and animal species under alternative C although there could be short-term minor adverse impacts. If protocols are followed, inventory and preservation of habitats would provide some opportunity for long-term beneficial effects. Impacts from trail use to special status species in the national parks would be negligible, neither adverse nor beneficial. Impacts from trail use along segments included in the Ala Kahakai NHT would be expected to be minor short-term adverse effects and long-term minor beneficial effects. Along trail segments not incorporated into the national trail, the potential for adverse impacts would continue, but would be mitigated by enforcement of state laws. Cumulative effects would be moderate to major and adverse; the contribution of alternative C to these effects would be negligible.

No impairment in NPS areas is anticipated.

Effects on Scenic and Visual Resources

Methodology and Assumptions

Approaches to assessment of scenic and visual resources were obtained through relevant literature and consultation with experts and resource managers. The analysis is qualitative. Impacts were assessed using best professional judgment and the following criteria to define impact intensities:

Shorline Residence, Mauna Kea Beach Resort, S. Kohala, NPS photo

Impact Intensity	Impact Description
Negligible	Effects to the visual quality of the landscape would be at or below the level of detection; changes would be so slight that they would not be of any measurable or perceptible consequence to the visitor experience. Actions would not detract from significant views from the trail to the ocean, mountains, or other features or create a cluttered appearance.
Minor	Effects to the visual quality of the landscape would be detectable, localized, and would be small and of little consequence to the visitor experience. Actions would somewhat detract from significant views from the trail to the ocean, mountains, or other features or create a cluttered appearance Mitigation measures, if needed to offset adverse effects, would be simple and successful.
Moderate	Effects to the visual quality of the landscape would be readily detectable, localized, with consequences at the regional level. Actions would detract from significant views from the trail to the ocean, mountains, or other features or create a cluttered appearance Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.
Major	Effects to the visual quality of the landscape would be obvious, with substantial consequence to the visitor experience in the region. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

Effects on Scenic and Visual Resources from Alternative A: No Action

Analysis

Alternative A involves the four national parks and a limited number of trail segments on nonfederal lands on which there would be little development beyond the placement of trail markers. These markers would be located with attention to the visual environment. On the whole, scenic visual resources would continue to be affected as they are now, and effects from the Ala Kahakai NHT would be negligible, neither adverse nor beneficial.

Development actions taken on nonfederal lands along the trail corridor would provide major long-term adverse affects to the visual environment of the trail. Currently, many sections of the *ala loa* that may become the Ala Kahakai NHT are incorporated into resort developments where they are often paved or rerouted and travel across or next to golf courses and residential developments. Views to the mountains, the ocean, or culturally significant landmarks are often obscured by these developments.

Cumulative Effects

Impacts to scenic qualities within the national parks would be negligible; however, their visual environment can be adversely impacted by development on their boundaries such as the Kohanaiki development adjacent to Kaloko-Honokōhau NHP.

Culturally important views from the trail would be impacted by many actions described in the cumulative impacts scenario. The scenic quality on nonfederal land along the trail corridor, with the exception of state parks, would suffer major, long-term adverse effects by development that changes the natural character of the area. Even though developments such as golf courses are considered to be amenities by developers, they have negative effects on the visual character of the native environment and *wahi pana*. Landform changes, housing, fences, commercial developments, and similar projects, all would have long-term direct adverse affects on the visual character of the trail experience.

Conclusion

There would be negligible impacts to scenic and visual resources as a result of implementing alternative A. Development within the trail

corridor on nonfederal land could have minor to major generally adverse effects on the trail visual environment and scenic resources.

No impairment of visual resources in NPS areas is anticipated.

Effects Scenic and Visual Resources from Alternative B: Single Trail

Analysis

Effects on visual resources within national parks would be the same as alternative A.

Alternative B proposes a continuous linear trail and negotiated adjacent protected areas on nonfederal lands. Trail facility development such as parking areas, rest rooms, trash receptacles, shelters, and signs have potential to affect the scenic quality of the trail corridor.

Alternative B includes management measures that would reduce the effects on scenic and visual resources. Design guidelines would be developed for the length of the trail. All planning before any trail development would be site specific and would locate improvements in a manner to least affect the area's scenic character and views. Trail markers would be kept to the minimum required to guide visitors and would be designed to be appropriate to the area. Wayside exhibits and signs would be installed along the trail only at those sites that require interpretation for user safety, understanding, and enjoyment. Actions to minimize potential adverse effects to scenic resources of trail facility construction would be addressed in trail segment management plans and implemented as the facilities are designed and built. With mitigation measures in place, adverse impacts to visual resources would be expected to be minor to moderate short and negligible to minor long-term.

The scenic environment outside the area of NPS administrative oversight of the of the linear trail segments and negotiated adjacent protected areas incorporated into the Ala Kahakai NHT could be adversely affected by development, changes in land use, or activities such as littering or trash dumping.

Cumulative Effects

With careful planning and design and attention to the visual environment, the Ala Kahakai NHT would have minor adverse impacts on scenic resources. Trail design standards, sustainable and site-appropriate construction, and aesthetic marking would mitigate potential adverse effects. Development within the trail corridor outside of the control of the NPS would most likely have long-term direct moderate to major adverse effects on the visual environment of the trail.

Conclusion

There would be negligible to minor impacts to visual resources from development of the Ala Kahakai NHT or related trail facilities by implementing alternative B. Development outside of the immediate area of effect of the trail and negotiated adjacent protected areas would be expected to have moderate to major adverse impacts on scenic resources related to the trail. Development within the trail corridor on nonfederal land along segments of trail before they are incorporated into the Ala Kahakai NHT could have long-term adverse impacts on the trail scenic resources.

No impairment of scenic or visual resources in NPS areas is anticipated.

Effects on Scenic and Visual Resources from Alternative C: Ahupua'a Trail System

Analysis

Effects on visual resources within national parks would be similar to alternatives A and B, except that the network of trails included in alternative C would require more trail markers to identify the various trails included in the network. To minimize this impact, the marker would be relatively inconspicuous and mounted to fit the landscape character of each area. The need for signs and markers would be reduced with the

use of maps and self-guided tour brochures and pamphlets. Alternative C could result in long-term minor adverse effect on the scenic and visual resources of the parks.

Alternative C would include a linear trail and a system of traditional trails on public lands. Management measures would be applied as in alternative B; however, because of the need to mark and interpret several trails, more trail markers, informational signs, and wayside exhibits would be needed. Mitigations for these effects would be the same as for NPS parks. Greater opportunities would exist on public lands to evaluate and protect scenic resources, especially those associated with Hawaiian stories and values, resulting in a moderate beneficial effect.

Affects to visual resources along the linear trail across private lands would be the same as alternative B. On private lands and some state lands, such as Kona Kai Ola, scenic resources of areas outside of the trail right-of-way and negotiated adjacent protected areas of segments incorporated into the Ala Kahakai NHT would continue to be affected by development, changes in land use, or activities such as littering or trash dumping.

Cumulative Effects

Cumulative projects would result in moderate to major adverse, long-term effects on scenic and visual resources. Growing developments in areas surrounding the trail such as the state project, Kona Kai Ola, and the private development, Shores at Kohanaiki, would have an overall negative effect on the scenic and visual resources of the region. On the other hand, for the park at Kīholo, the state has the goal of insuring retention of the fast-disappearing natural open space and the open coastal views from the highway. That project would have long-term major beneficial effects on scenic and visual resources and on the setting of the Ala Kahakai NHT.

Conclusion

Implementation of alternative C would result in minor adverse long-term effects on visual resources. The cumulative projects would result in both moderate to major long-term adverse and beneficial effects depending upon the project.

No impairment of scenic or visual resources in NPS areas is anticipated.

Effects on Wilderness Values

Methodology and Assumptions

Fourteen miles of the Ala Kahakai NHT are within the wilderness area of Hawaii Volcanoes NP. The park's draft wilderness management plan identifies certain resources values and protocols including minimum requirement and minimum tool.

In addition, the wilderness area through which the Ala Kahakai NHT travels is encompassed by the Puna-Kaʻū Historic District. Included in this district are over 107 designated sites identified by the 4,596 features including several petroglyph fields, village complexes, historic trails, and caves. One of the petroglyph fields within the wilderness includes approximately 21,000 individual images or carvings in stone. In these areas, often the natural environment has been modified to such an extent that the constructed environment dominates the landscape and does not meet the definition of wilderness. These areas are included in the wilderness area because they predate the Wilderness Act. The campsites along the coastal trail are located in these areas. Management of the wilderness area at Hawaiʻi Volcanoes NP is committed to protecting these cultural resources that are also significant to the Ala Kahakai NHT. In these cases, the area is managed according to cultural resource guidelines while maintaining the minimum requirement and minimum tool.

In addition, an area on the coastal flats west of Kaʻaha totaling over 6,450 acres was set aside during World War II as a bombing range by special legislation. This area has not been completely cleaned of live munitions and has limitations on scientific and visitor use until this is accomplished.

The thresholds of change for the intensity of impacts on wilderness values are defined as follows:

Impact Intensity	Impact Description
Negligible	The action would have no discernable effect on opportunities for solitude, for primitive and unconfined forms of recreation, and the prevalence of natural conditions. The wilderness are would continue to be primarily affected by forces of nature.
Minor	The action would have a slightly beneficial or adverse effect on opportunities for solitude in a limited area of wilderness, such as along a singe trail. The action would slightly reduce or improve opportunities for primitive and unconfined forms of recreation in limited areas of the wilderness. The action would result in slightly detectable beneficial or adverse human-caused impacts to the natural environment in limited areas of the wilderness. Natural conditions would continue to predominate.
Moderate	The actions would result in readily apparent beneficial or adverse effects on opportunities for solitude in limited areas of wilderness. It would noticeably improve or reduce opportunities for primitive and unconfined forms of recreation in limited area of wilderness. It would result in readily apparent beneficial or adverse human-caused impacts in limited areas of the wilderness. Natural conditions would continue to predominate.
Major	The action would have readily apparent beneficial or adverse impacts on opportunities for solitude throughout the wilderness. The action would substantially improve or reduce opportunities for primitive and unconfined forms of recreation throughout the wilderness area. The action would result in readily apparent beneficial or adverse human-caused impacts to the natural environment throughout the wilderness.

Effects on Wilderness Values for Alternative A: No Action

Analysis

Under alternative A, wilderness within Hawai'i Volcanoes NP would be managed under the park's wilderness management plan, now in draft, and in coordination with the park's resource managers. Historic trails in the wilderness area would be retained. Although not mentioned specifically in the draft wilderness plan, the Ala Kahakai NHT would most likely fall into semi-primitive, Class II[52], or primitive, class III categories.

Within the wilderness area encompassing the Ala Kahakai NHT corridor, wilderness opportunities would remain, and visitors could continue to experience wilderness values such as solitude and freedom from human impact. In this area, the current trail inventory would be retained, but trail maintenance would depend upon the specific trail. Trail tread would not be constructed specifically for the national trail. The Ala Kahakai NHT would be marked with cairns and, as appropriate, with a small unobtrusive logo and arrow. There would be little change from current uses of the wilderness in the park, and actions specific to the Ala Kahakai NHT are anticipated to have negligible to minor long-term adverse impacts on wilderness values.

Wilderness visits for overnight users would be managed by the wilderness permit system. Campsites that are currently designated in the wilderness area within the Ala Kahakai NHT corridor would remain and could be used by trail users with permits. Use of campsites by Ala

[52] In the semi-primitive zone (Class II), trails are regularly maintained and kept in generally good condition with occasional problems with erosion. Campsites are generally indicated by the presence of bare ground and vegetation trampling. Pit toilets are provided to prevent environmental and health problems. Hikers encounter between 1 to 10 groups enroute to camping locations. Other campers are routinely encountered and should be anticipated at camping sites.

In the primitive zone (Class III) trail routes are marked with cairns; there is no brushing or tread maintenance. Camping areas are generally indicated. There are few if any signs of previous use. No toilet facilities are provided. Hikers encounter less than one other group per day on the trail. Campers may have pne other group in proximity to their campsite (Draft Wilderness Management Plan, Hawai'i Volcanoes National Park)

Kahakai NHT users is anticipated to cause little change to the wilderness experience now offered by the park and is expected to have negligible to minor adverse impacts on wilderness values.

Interpretation of cultural sites related to the *ala loa* would be offered at trail heads away from the wilderness area or in brochures or other written media minimizing the effect on the wilderness area. Interpretation of the former village sites and associated cultural resources and the knowledge that all of the wilderness campsites are located on former village sites would have minor long-term beneficial effects on the user experience of the wilderness area, but it would have negligible effects, neither adverse nor beneficial, on wilderness values.

Cumulative Effects

The Hawai'i Volcanoes NP wilderness area was designated in 1975. Existing impacts within the Ala Kahakai NHT corridor include a trail network, trail shelters, water caches, and signs. Most of these were in place prior to the establishment of the wilderness area. The effects could include the impacts on the naturalness of the area, and distractions associated with the presence and maintenance of the trail and facilities and other reminders of modern society. Continued management and operation of these facilities could result in adverse, short and long-term, minor to moderate impacts in limited areas of the wilderness from the use of mechanized equipment if determined to be the minimum tool, other noise related to project work, and the presence of work crews. However, designation as a part of the wilderness preservation system has resulted in long-term, major beneficial effects on the resources and visitor experience in the area.

Implementing alternative A would contribute slightly to the adverse effects of ongoing operations through trail use, but there would still remain opportunities for solitude in the areas away from the trails and campsites. Therefore, the overall cumulative effects on wilderness values would be short-term, minor, both beneficial and adverse.

Conclusion

Implementing alternative A, would result in long-term negligible adverse impacts on wilderness values, short-term minor adverse effects on operations, and short-term either minor adverse or beneficial effects on visitor experience depending upon if the user is seeking solitude or cultural information.

There would be no impairment of wilderness values as a result of this alternative.

Effects on Wilderness Values for Alternative B: Single Trail

Analysis

Since the trail would be recognized within the national park in all alternatives, analysis for alternative B is the same as alternative A.

Cumulative Effects

The same as alternative A.

Conclusion

The same as alternative A.

Effects on Wilderness Values for Alternative C: Ahupua'a Trail System

Analysis

Since the trail would be recognized within the national park in all alternatives, analysis for alternative B is the same as alternative A.

Cumulative Effects

The same as alternative A.

Conclusion

The same as alternative A.

Effects on User Experience

Methodology and Assumptions

"User" includes residents and others who now use portions of the Ala Kahakai as access to the shoreline and nearshore resources, Native

Hawaiians exercising their subsistence rights to nearshore resources, and tourists. The user may be from outside the area or a local resident—a Native Hawaiian could fit either category—each having very different needs and expectations for a trail experience.

Three components of user experience are discussed: social, recreational, and intellectual/emotional. The social aspects of user experience include crowding or the perception of crowding to local users and the effects of trail use on Native Hawaiians exercising their traditional rights. Recreational aspects include the range of experiences available and the health and safety challenges of using the trail. The intellectual/emotional aspects of user experience include the presence or absence and quality of information, interpretation, and education; the opportunities to experience and understand traditional Hawaiian culture; and the provision of opportunities for Native Hawaiians to walk in the footsteps of their ancestors or to exercise their traditional rights.

Public scoping input combined with information from other national scenic and historic trails was used to estimate the effects of the actions of the alternatives. The impact on the ability of the user to experience a full range of Ala Kahakai NHT resources was analyzed by applying the significance statements and fundamental resources and values presented in chapter 1 of this document. The potential for change in user experience proposed by the alternatives was evaluated by identifying projected increases or decreases in user experience and enjoyment and determining whether or how these projected changes would affect the desired user experience and to what degree.

The thresholds of change for the intensity of impacts on user experience are defined as follows:

Impact Intensity	Impact Description
Negligible	Changes in user experience would be below or at the level of detection. The user would not likely be aware of the effects associated with the alternative.
Minor	Changes in user experience would be detectable, although the changes would be slight. The user would be aware of the effects associated with the alternative, but the effects would be slight.
Moderate	Changes in user experience would be readily apparent. The user would be aware of the effects associated with the alterative and would likely be able to express an opinion about the changes.
Major	Changes in user experience would be readily apparent and severely adverse or exceptionally beneficial. The user would be aware of the effects associated with the alternative and would likely express a strong opinion about the changes.

Hiking on the 1800 Lava Flow, N. Kona, NPS photo

Manini'owali, N. Kona NPS photo

Effects on User Experience from Alternative A: No Action

Analysis

Under alternative A, the Ala Kahakai NHT would consist of the segments of the trail within the four national parks and a few of the nonfederal segments included in the Nā Ala Hele inventory, most likely the state-owned segments of the state designated Ala Kahakai. Because visits to the island of Hawai'i are expected to increase and because the parks are key destinations on the auto tour for the Ala Kahakai NHT, the trail may contribute to increased visits to the parks. Since groups touring the Ala Kahakai NHT would be most likely to follow the auto tour route, the potential for crowding or perceived crowding at auto tour sites would affect the visitor experience. These effects could be lessened by instituting a tour permit system that would monitor site visits.

Traditional users would continue with the access they have today to the parks and other sites associated with the trail, but may experience a sense of crowding or a lack of solitude with added visitors along the shoreline.

Under alternative A, the NPS would have limited ability to incorporate trail segments into the Ala Kahakai NHT. Visits to publicly accessible areas of the trail route that are not incorporated in the Ala Kahakai NHT would be expected to increase in conjunction with expected growth in tourism to the Island of Hawai'i. Trail users on these parts of the trail route could unknowingly impinge on Native Hawaiians' traditional practices. Crowding or perceived crowding in areas expected to provide solitude may occur.

Because the Ala Kahakai NHT is discontinuous under alternative A, the recreational user could be confused by a variety of signs and allowable uses depending upon whether the trail segment is incorporated into the NHT or is part of another jurisdiction. There would be no opportunity for through-hiking or overnight camping along a continuous Ala Kahakai NHT.

Health hazards, such as air quality, lava, tsunami, poisonous insects, and so forth, along official components of the Ala Kahakai NHT would be addressed through safety messages and other forms of education. The users of the numerous nonfederal segments of the trail route that could not be included in the Ala Kahakai NHT under alternative A could be exposed to unsafe conditions without warning and appropriate preparation. Limiting use of the Ala Kahakai NHT to walkers would protect the serenity of the trail experience from motorized uses; however, regulating use may cause impacts to current users who may find that regulations limit their use and enjoyment of trails.

Interpretive materials regarding the Ala Kahakai NHT offered at the parks and along the auto tour route would provide the potential to increase public understanding of the significance of the trail and its relationship to the Hawaiian culture increasing visitor understanding and experience. An increased number of people would experience the ancient and historic *ala loa* without knowing or understanding its significance, missing out on enrichment of their experience and resulting in a minor adverse impact.

Cumulative Effects

Alternative A would have negligible affects on regional recreational opportunities. On the other hand, the expected increase in population and tourism will fuel demand for more recreational opportunities that could have an impact on the Ala Kahakai NHT. The general increase of visitors to Hawai'i Island provides the potential for crowding or perceived crowding along the shoreline, affecting all users including those of the Ala Kahakai NHT.

The potential threat would remain from unregulated private business operators who lead tours or other activities along the trail that may crowd the trail or misinform visitors.

Conclusion

Implementing alternative A would result in minor beneficial long-term effects on the current visitor experience in the national parks, on official components of the Ala Kahakai NHT on nonfederal lands, and along the auto tour route. The potential to visit trail sites and segments that are protected, interpreted, and monitored, would provide a long-term minor beneficial effect of visitor experience.

Traditional users would continue with the access they have today to the parks and other sites associated with the trail, but may experience a sense of crowding or a lack of solitude resulting in short-term adverse effects. Increased crowding and impacts to Native Hawaiian traditional rights along segments of the route not incorporated into the national trail could result in minor to major adverse effects on these users.

The limited ability of the NPS to incorporate trail segments into the Ala Kahakai NHT would result in short and long-term minor to moderate adverse impacts on recreational use of the trail. The lack of trail continuity and varying jurisdictional approaches along the trail route would result in short and long-term moderate to major adverse effects on recreational trail user experience.

Addressing health hazards along official components of the Ala Kahakai NHT through safety messages and other forms of education would result in short and long-term minor to moderate direct beneficial effects to trail users. The users of the numerous nonfederal segments of the trail route that could not be included in the Ala Kahakai NHT under alternative A could be exposed to unsafe conditions without warning and appropriate preparation resulting in short and long-term moderate to major adverse effects on their health and safety.

Limiting use of the Ala Kahakai NHT to walkers would protect the serenity of the trail experience from motorized uses resulting in short-term minor beneficial effects. Regulating use may cause some short-term, minor impacts to current users who may find that the regulations limit their use and enjoyment of trails.

Interpretive materials regarding the Ala Kahakai NHT offered at the parks and along the auto tour route would provide the potential to increase public understanding of the significance of the trail and its relationship to the Hawaiian culture, resulting in minor to moderate beneficial impacts on visitor understanding and experience. Because the trail would be discontinuous, trail users could experience the ancient and historic *ala loa* without knowing or understanding its significance, missing out on enrichment of their experience and resulting in a minor adverse impact to their experience. Benefits would be limited by the few opportunities to experience the ancient and historic *ala loa* and learn of the traditional Hawaiian use of trails.

Opportunities for education and experience of the Hawaiian culture, though limited, would be available to users of the Ala Kahakai NHT, resulting in minor beneficial effects. The lack of needed safety messages along those portions of the trail corridor not incorporated into the Ala Kahakai NHT could have minor to moderate adverse effects on visitors.

Effects on User Experience from Alternative B: Single Trail

Analysis

This alternative includes a continuous trail incorporating segments of the ancient and historic *ala loa*. Development of the Ala Kahakai NHT would increase public access to the shoreline and encourage recreational trail use. Promotion of protected trail segments would result in more tourists visiting the trail. The number of residents who would intentionally use the Ala Kahakai NHT is unpredictable. Given that it is parallel to or along the shoreline and that most resident of Hawai'i prefer beach or ocean activities (DLNR, 2003), it would seem that a substantial portion of the local population might

encounter the trail, at least casually, as they access nearshore ocean recreation activities. Trail segment management plans would address the potential adverse effects of higher levels of use expected near population centers and resorts in the South Kohala and North Kona districts. A permit system for commercial tours would reduce the potential to impact local communities with oversized or inappropriate vehicles or crowd the trail with tour groups resulting in moderate beneficial effects. More remote sections of trail or those in less developed areas that may be valued for their primitive qualities and opportunities for solitude would be protected.

Under alterative B, Native Hawaiians would have more opportunities to access cultural resources and gathering areas along the Ala Kahakai NHT; however, they might also experience more intrusion on their activities by tourists or local users. The user capacity analysis and permit system included in each trail segment management plan would attempt to ensure the quality of visitor experience and reduce these impacts to a negligible effect.

Under alternative B, trail users would be provided access to additional segments of the ancient and historic trail. A continuous trail would provide through-hiking and overnight camping opportunities. Elimination of unauthorized uses such as ATVs would provide positive effects to trail users seeking quiet, solitude, and a historical experience, but would be experienced as adverse to users who want to continue their ATV activities. A variety of hazards along the trail would be addressed at appropriate places through signs, informational publications, and possibly barriers or other means to prevent harm.

Development of a comprehensive interpretive plan would coordinate overall interpretive and educational planning for the trail and additional interpretive and educational opportunities would result. For instance, as the trail becomes marked and interpreted, especially at public access points to the shoreline, many residents as well as visitors from other places could learn of its significance and better understand and appreciate the trail's role in Hawaiian culture. Linking cultural sites and telling place-related stories along a 175-mile trail, the Ala Kahakai NHT would provide the opportunity to experience the range of Hawaiian culture and the unfolding of Hawaiian experience on the land. Educating property owners about the history and location of ancient and historic trail on their properties would provide the benefits of alerting them to the opportunities and responsibilities of recognizing the trail.

Visitors would enjoy the benefits of the auto tour as in alternative A. Organized, coordinated, and well-informed educational programs, ecotourism, and heritage tourism would result in additional moderate beneficial effects.

Cumulative Effects

Under alternative B, the Ala Kahakai NHT would help meet a regional recreation need identified in the State Comprehensive Outdoor Recreation Plan (SCORP) for "cultural and historical parks that promote preservation and interpretation of archaeological and sacred sites, restoration of ancient fishponds, and workshops that perpetuate cultural traditions" (DLNR, 2003). A continuous protected and interpreted trail and associated resources would provide moderate beneficial effects to Native Hawaiian traditional rights and uses.

Conclusion

Experiencing evidence of ancient and historic places, events, activities, and changes over time along a continuous trail route would result in moderate to major short and long-term beneficial effects on visitor understanding and appreciation of the Hawaiian culture.

Trail segment management plans would address the potential adverse effects of higher levels of use expected near population centers and resorts in the South Kohala and North Kona districts. An established approach to carrying capacity would

contribute to a positive short-term recreational experience and result in minor to moderate beneficial effects on trail user experience. A permit system for commercial tours would reduce the potential to impact local communities with oversized or inappropriate vehicles or crowd the trail with tour groups resulting in moderate beneficial effects.

Commercial tours that operate without permits would result in moderate to major adverse short-term effects on trail users seeking quiet, solitude, or a historical experience of the trail.

The opportunity for extensive travel on a continuous trail with through-hiking and overnight camping would result in moderate short-term beneficial effects on recreational opportunity. Protection of more remote sections of trail or those in less developed areas that may be valued for their primitive qualities and opportunities for solitude would provide moderate to major beneficial effects.

Elimination of unauthorized uses such as ATVs would provide moderate to major beneficial effects to trail users seeking quiet, solitude, and a historical experience, but could be experienced as adverse to users who want to continue their ATV activities.

Linking cultural sites and telling place-related stories along the entire Ala Kahakai NHT would provide the opportunity to experience the range of Hawaiian culture and the unfolding of Hawaiian experience on the land. Better public understanding of resource significance and the ability of Native Hawaiians and local users to walk in the footsteps of the ancient people and experience the diversity of the Hawaiian culture would result in moderate to major short and long-term beneficial effects.

Addressing the variety of hazards along the trail at appropriate places through signs, informational publications, and barriers or other means to prevent harm would result in moderate beneficial effects on user health and safety.

A comprehensive interpretive plan would coordinate overall interpretive and educational planning for the trail resulting in long-term moderate beneficial impacts on planning for interpretation and education. Additional interpretive and educational opportunities would result in moderate to major beneficial effects.

Effects on User Experience from Alternative C: Ahupua'a Trail System

Analysis

Alternative C would incorporate all the trail user values included in alternative B, but these would be expanded to include more opportunities for education and experience of the Hawaiian culture on public lands. As in alternative B, promotion of protected trail segments would result in more trail users. They would have additional access to ancient or historic trail segments, gaining lateral shoreline access to areas not now easily accessible and using *mauka* trail segments to experience the traditional Hawaiian trail system. Users would benefit from added interpretive, educational, and recreational opportunities tied to on-the-ground resources, *mo'olelo* (stories), and *wahi pana* (storied and sacred places). Educational programs would promote hands-on application, understanding, and appreciation of Hawaiian conservation values and ethics. The trail would become a setting where people can learn from *kūpuna* or other traditional practitioners about land management and conservation. Geotourism that sustains the environment, cultures, aesthetics, heritage, and well-being of the residents and enhances community-based economic development and revenue generating activities would be encouraged.

Higher levels of use would be expected near population centers and resorts in the South Kohala and North Kona districts providing opportunities to educate many trail users into the history and culture of Hawai'i. The more remote sections of trail or those in less developed areas would have less tourism and may become valued for their primitive qualities and opportunities for solitude.

Cumulative Impacts

Cumulative impacts described in alternative B would apply with the addition that opportunities for visitors interested in gaining knowledge of Hawaiian history and culture through the experience of the living culture along the route would result in moderate beneficial effects.

Conclusion

All impacts described for alternative B would apply, but in addition, visitors interested in gaining knowledge of Hawaiian history and culture through the experience of the living culture along the route would experience moderate to major beneficial effects. Providing opportunities for local residents, Native Hawaiians, and tourists to experience the ancient and historic Hawaiian system of trails would result in moderate to major short and long-term beneficial effects. Increased opportunities for local Hawaiians to practice their traditional culture would result in short and long-term moderate to major beneficial effects.

Using the trail as a setting where people can learn from *kūpuna* or other traditional practitioners about land management and conservation would result in short and long-term moderate to major benefits to trail users. Encouraging that sustains the environment, cultures, aesthetics, heritage, and well-being of the residents would result in minor to major short and long-term benefits to the trail user and the local communities.

Mamalahoa Trail Clearing by Kealakehe HS Students, N. Kona, NPS photo

Effects on the Socioeconomic Environment

Methodology and Assumptions

Socioeconomic factors considered are effects on the economy and nearby communities and landownership.

To identify and discuss potential impacts to the economy of nearby communities, factors considered were economic and tourist data developed by the state of Hawaii.

To identify and discuss potential impacts to landowners, concerns expressed by landowners and applications of the state law as it affects properties with cultural resources and ancient trail were considered. On state-owned segments of trail crossing private property, landowners may have concerns with the trail alignment across their property. Landowners have expressed concerns for the potentially negative actions of recreational trail users who may trespass to camp, picnic, litter, or vandalize their property if trail rules are unenforced. They have concerns that the Ala Kahakai NHT could leverage public opinion to affect their ability to use their lands. They are concerned that everything that can be seen from the trail, not just the trail right-of-way and negotiated adjacent protected areas, would be affected. They also have concerns for their liability if the public uses a trail across their land.

Public agencies could be impacted by having to manage more land or to manage it in a new way. Impacts to private landowners and public agencies could be reduced through NPS technical and financial assistance.

Socioeconomic impacts were determined based on professional expertise and judgment. A qualitative analysis is sufficient to compare the effects of the alternatives for decision-making purposes.

The thresholds of change for the intensity of impacts on socioeconomic environment are defined as follows:

Impact Intensity	Impact Description
Negligible	No effects occur or the effects on socioeconomic conditions and on landowners are below or at the level of detection.
Minor	The effects on socioeconomic conditions and on landowners are small but detectable, and only affect a small number of firms, a small portion of the population, or a few landowners. The impact is slight and not detectable outside the affected area.
Moderate	The effects on socioeconomic conditions and landowners are readily apparent. Any effects result in changes to socioeconomic conditions on a local scale or on a large number of landowners.
Major	The effects on socioeconomic conditions are readily apparent. Measurable changes in social or economic conditions at the district level. The impact is severely adverse or exceptionally beneficial within the area of the trail.

Effects on the Socioeconomic Environment from Alternative A: No Action

Analysis

Under alternative A, the Ala Kahakai NHT would exist only in the four national parks and along the few nonfederal segments able to be incorporated into the trail under current funding. The auto tour route would be marked and an interpretive brochure available to guide visitors. This tour could possibly extend visitor days to the island for those visitors who visit the national parks by encouraging them to experience the other 14 historic sites along the auto tour route. Visitor surveys would be required to determine whether site visits are due to trail use or to other tourism activities. No change would be expected to local uses within the trail corridor as a result of this alternative.

The Economy and Nearby Communities

The national trail designation and the auto tour route may attract tourists to the trail. A study on the economic impacts of long-distance trails found that visitors to the Overmountain Victory National Historic Trail[53] (Moore *et al.*) generated $5.38 million in "new money" and $7.55 million in total economic impacts. The biggest beneficiaries were the eating and drinking, retail, and hotel and lodging industries (Moore: viii).

This study also found that visitors came to the sites associated with the trail to learn history, be in nature, and have a good time. Interpretive information and natural settings were the most favored aspects of the trail experience.

This CMP assumes that few travelers would come to the island of Hawai'i specifically to experience the Ala Kahakai NHT. Nonetheless, since the trail incorporates sites already heavily visited such as the national parks and state parks and monuments, it is possible that trail use could encourage tourists to extend their stay on the island of Hawai'i to learn more about the history and culture of the island. The actual economic impact generated by the Ala Kahakai NHT cannot be determined at this time.

Landowners

Participation of landowners in the Ala Kahakai NHT is voluntary. However, under state law, the Highways Act of 1892, the state owns and holds for the public segments of trail identified as ancient and historic and the landowner is required to protect and often to mange these cultural assets. Some of those trail segments may be recognized as part of the Ala Kahakai NHT, and interested landowners would be eligible for technical assistance of the NPS to help with resource protection and management.

[53] Located in the states of Virginia, Tennessee, North and South Carolina, the Overmountain Victory National Historic Trail is the only trail in the National Trail System to have a completed economic impacts study.

Under alternative A, landowners, state and county land managing agencies could be affected, especially State Parks and Nā Ala Hele, by the need to manage more trail segments or to manage trails according to NPS standards. Impacts on these agencies could be reduced through added NPS technical assistance and limited funding resulting in a minor beneficial effect.

A few trail segments either in resorts or large developments crossing private land would be incorporated into the Ala Kahakai NHT under alternative A. Mitigations to landowner concerns include involving landowners on trail planning teams for any segment of trail that affects their property; clearly marking private property adjacent to the trail; promoting trail segments for public use only after an entity such as the NPS, the state, or a Native Hawaiian or local volunteer group is identified to maintain the trail and monitor its use.

Under alternative A, trail designation does not impact private landowners regarding federal acquisition because land would be acquired, if at all, only from willing sellers or donors. Private landowner liability would not be an issue on state-owned trail across private property as the state would be liable. People straying from the trail would be trespassing and would be subject to related laws. If a private landowner owns the trail and allows public use, Hawaii State law would provide liability protection. (See Appendix A for legislation.)

Under alternative A, landowners would continue to experience whatever impacts of recreational use that occur now. As the public becomes aware of segments of the *ala loa* that are land banked by the state, pressure may be applied to landowners to open the trail on their property to public use resulting in minor or moderate adverse impacts on landowners. Under alternative A, the amount of public use would be limited by Nā Ala Hele's ability, with limited funds, to prepare cultural resource management plans and to manage and maintain the trail segments.

Cumulative Effects

No cumulative impacts to the economy would be expected under alternative A. Impacts would continue as they are today. Landowners would feel little more than they do today under state and county laws and regulations.

Conclusion

Negligible effects to the economy and nearby communities would result from alternative A.

Landowners would feel little more than they do today under state and county laws and regulations. It is possible that a landowner could feel pressure from the public to open a trail to public use across private lands resulting in a short to long-term term minor adverse effect on the landowner. This would occur as a state requirement of the landowner. On the other hand, the landowner could also receive technical and limited financial assistance in trail and resource management from the NPS resulting in short and long-term minor beneficial effects.

Effects on the Socioeconomic Environment from Alternative B: Single Trail

Analysis

The Economy and Nearby Communities

The auto tour route could attract visitors as in alternative A, but as in that alternative, visitor surveys would need to be conducted to determine whether site visits are due to trail use or to other tourism activities. Local users would find more recreational opportunities under alternative B, but their uses would most likely not contribute to the overall economy. Any actions taken to implement this alternative would be spread out over time and space, thereby limiting the degree of beneficial effect. Efforts to protect, develop, maintain, and manage the trail would create some new localized and relatively minor spending. Expenditures for labor and materials would be short-term and would accrue to a few individuals or firms. Some of the smaller communities along

the route could benefit from increased tourist spending as trail use increases. Local businesses such as food service, lodging, camping, sporting goods, and bookstores could receive some benefits from sales to trail users. Increased trail use would not be expected to affect the overall profitability of these businesses. Some trail proponents have envisioned small bed and breakfast establishments along the trail operated by local landowners. It is possible that minor economic benefit could accrue to landowners in this instance.

Landownership

Under alternative B, which proposes a linear trail alignment, ownership records would be reviewed for ancient and historic trail segments along the trail route. For state-owned segments, even if crossing private land, the trail would be made available to the public after management plans are completed and a trail segment manager in place. More trail users would be attracted to use the public trail as it passes through private land on state-owned trail, increasing the potential for trespassing.

Trail designation would not impact private landowners regarding federal acquisition because land would be acquired, if at all, only from willing sellers and donors. Under alternative B, the NPS would not seek to manage the state-owned segments of trail, but would provide technical assistance and limited financial assistance to State Parks and Nā Ala Hele for their management of the trail resulting in minor to moderate beneficial effects on these agencies.

Federal laws would apply only to the trail and agreed upon adjacent areas and not to the rest of the landowner's property. The state of Hawai'i has many laws that address similar concerns to federal laws and in some cases these laws are more stringent. These laws apply to landowners now and would continue to do so. Generally, for any action regarding any segment of the Ala Kahakai NHT, joint state and federal environmental assessments (EAs) or statements (EISs) would be prepared. It is not anticipated that meeting federal requirements would add significantly to existing requirements of state and local regulations. Adding NPS technical and limited financial assistance could result in benefits to landowners

It is possible that a landowner may wish to protect for public use and enjoyment resources adjacent to and associated with the trail. Participation by landowners in the national trail is voluntary, though encouraged, and requires an agreement with the NPS. Experience on other national trails indicates that many landowners take pride in preserving trail resources. Recognition of trail sites provides a positive way for landowners to help preserve resources without giving up ownership rights. Interested landowners could be encouraged to incorporate their resources into the Ala Kahakai NHT so that they would receive the benefits of NPS technical and possible financial assistance in protecting those resources. Easements and partial interests in land can sometimes provide significant tax relief under the National Trails System Act, as amended, section 7(k).

Those landowners not wishing to participate may receive public pressure to do so, especially if the land represents a linking segment that could help create a continuous trail. The degree of pressure and the need for landowner response cannot be estimated at this time.

Cumulative Effects

The auto tour could add an undetermined number of visitors to trail sites and to experience the trail.

Over time, the Ala Kahakai NHT would become a continuous 175-200 mile trail. Only the trail right-of-way and agreed upon adjacent areas would be directly affected. Approximately 35 miles of state-owned trail across private property would be affected. State and county parks and trails in Nā Ala Hele jurisdiction would also be affected as approximately 46 miles within state land are affected by the Ala Kahakai NHT. With NPS

technical and financial assistance, these impacts could be positive for the private landowner and the agencies. Without help, the state could have many more miles of trail to protect and manage than if can effectively care for.

Conclusion

Even if tourists do extend their stays to experience the trail, the effects on the local economy would be expected to be negligible given the $1.31 billion visitors already spend on island of Hawai'i visits (County, 2004).

Effects to private landowners from federal actions as a result of development of the Ala Kahakai NHT would generally be negligible to minor under alternative B as the state already requires protection of ancient and historic trails. The landowner could experience adverse effects if required to protect trail fabric and segments in place instead of moving a trail to a more convenient location for project purposes. If a landowner chooses to include resources associated with the Ala Kahakai NHT in the trail management, effects could be beneficial to the landowner and the public.

Adding NPS technical and limited financial assistance could result in short and long-term minor to moderate benefits to landowners.

Effects on the Socioeconomic Environment from Alternative C: Ahupua'a Trail System

Analysis

The Economy and Nearby Communities

Alternative C includes a linear trail alignment and a traditional system of trails on public lands, one purpose of which is to enhance cultural conservation through protection and interpretation of cultural sites and landscapes. These settings would offer opportunities for local Hawaiians to perpetuate their culture by taking care of the land in traditional and semi-traditional ways. This alternative provides for increased learning, skill building, livelihood and career track development for local people and offers a platform from which to launch culturally appropriate non-profit entrepreneurial or concession opportunities for revenue generation. These activities would fund trail resource management activities aimed at cultural and natural resource conservation and could bring some limited income to local communities resulting in negligible to moderate beneficial effects.

Landownership

Private landowners would experience the same effects under alternative C as in alternative B. However, under alternative C, the NPS would consider less-than-fee interest and management responsibilities for those trail segments along the Ala Kahakai NHT in the Nā Ala Hele inventory. State Parks would also be affected as this alternative includes public lands adjacent to the linear alignment of the Ala Kahakai NHT that contain other lateral and *mauka* segments of ancient and historic trails. With NPS assistance, State Parks could experience minor to moderate beneficial impacts. The NPS and the state would work out their relationship through an agreement. Without NPS assistance, State Parks could experience moderate to major adverse impacts.

Cumulative Impacts

The Ala Kahakai NHT would provide the setting for members of local communities to practice their culture and thereby develop culturally-linked economic opportunities and gain training that could improve their job and career options.

Cumulative impacts would be the same as described in alternative B except that larger areas state parkland would be incorporated into the trail.

Conclusion

Effects on the local economy and nearby communities would be similar to alternative B, but local communities would experience minor beneficial effects through participation in cultural conservation.

Effects would be the same as alternative B, for private landowners. Relieving Nā Ala Hele of

Mauna Lani Resort, S. Kohala, NPS photo

responsibility for trails in its jurisdiction along the Ala Kahakai NHT could be a moderate beneficial effect on the agency. State Parks would receive moderate to major beneficial effects if the NPS assists it with parklands adjacent to the linear alignment of the Ala Kahakai NHT that contain other lateral and *mauka* segments of ancient and historic trails. If NPS assistance were unavailable, State Parks could experience moderate to major adverse impacts.

Effects on Trail Operations

Methodology and Assumptions

Park operations refers to the capacity of trail administration to provide policy direction for the protection, public use, and appreciation of the trail and the ability of staff to adequately protect and preserve trail resources and provide for an effective user experience. The discussion of impacts on park operations focuses on the type of management structure, the number of staff available to ensure public safety and provide interpretation, and the ability of the staff to protect and preserve trail resources.

The trail superintendent and persons knowledgeable of administration and management of national historic trails were consulted to evaluate the impacts of implementing each alternative.

The thresholds of change for the intensity of impacts on trail operations are defined as follows:

Impact Intensity	Impact Description
Negligible	No effects would occur, or the effects on trail administration, management, and operations are below or at the level of detection.
Minor	The effects would be detectable, but would be of a magnitude that it would not have an appreciable adverse or beneficial effect on trail administration, management, and operations.
Moderate	Impacts would be readily apparent and would result in a substantial adverse or beneficial change in trail administration, management, and operations in a manner noticeable to staff and the public.
Major	Impacts would be readily apparent and would result in a substantial adverse or beneficial change in trail administration, management, and operations in a manner noticeable to staff and the public and would be markedly different from existing operations.

Shoreline Access Sign, Waikoloa, S. Kohala, NPS photo

Beach Trail sign, Mauna Lani Resort, S. Kohala, NPS photo

Effects on Trail Operations from Alternative A: No Action

Analysis

The Ala Kahakai NHT would continue to be administered by a superintendent and one full-time community planner. The four national parks would oversee their segments of the trail with little capacity for trail staff to assist. The Ala Kahakai NHT staff would continue to encourage the development of the Ala Kahakai Trail Association. Limited staff capacity and funding to assist the association would have moderate adverse effects on its growth and development. The NPS would support with technical and limited financial assistance Nā Ala Hele, State Parks, and non-profit community groups that want to care for official components of the Ala Kahakai NHT; however, limited staff numbers and funds would cause moderate adverse effects on the ability of NPS to provide support. Limited capacity to provide interpretation and education other than a trail brochure would have moderate adverse effects on user understanding and appreciation of the trail. The part of the public aware of the trail would be likely to notice deficiencies in the administration's ability to add trail segments and sites and to interpret them to a broader public. Public safety would be a concern of trail administration but could suffer negligible adverse effects.

Cumulative Impacts

Limited staff levels during the extended period of this plan would result in long-term moderate adverse cumulative impacts to public awareness and appreciation of the trail.

Conclusion

Under alternative A, staff levels would be inadequate to meet the goal of adding trail segments and sites to the Ala Kahakai NHT to create a presence for the trail, resulting in long-term moderate to major impacts to trail values.

Effects on Trail Operations from Alternative B: Single Trail

Analysis

Alternative B has a goal of adding needed staff positions focused on skills that can be most helpful to getting the trail on the ground, providing interpretation and education, and encouraging state agencies and local organizations in the development, management, and maintenance of the trail. Adding, along with the superintendent, a community planner, interpretive specialist, and volunteer coordinator/trainer would provide long-term major beneficial impacts to trail administration. Seeking other needed disciplines—archeologist, administrative assistant, GIS specialist, and trail maintenance coordinator—by sharing positions with the national or state parks, or Nā Ala Hele or through contracts would provide long-term minor benefits through reduced cost and moderate benefits of added staff. If these staff positions are achieved over the period of this plan, they will provide expertise needed to complete the linear trail; the capacity for resource protection; information, maps, interpretation, and education to the public; and training and support to state agencies and local organizations to help them manage, maintain, and monitor trail segments in a manner that protects trail values.

Cumulative Impacts

Operations under alternative B would have long-term moderate to major beneficial cumulative effects on trail resources and values.

Conclusion

Under alternative B, added funding and staff with skill in community planning, resource management, interpretation, and other disciplines would have long-term moderate to major beneficial effects on trail resources and values.

Effects on Trail Operations from Alternative C: Ahupua'a Trail System

Analysis

Alternative C has similar operational goals of alternative B, but in the event of taking on management responsibilities for state-owned trail, would add a law enforcement/interpretive ranger. In addition to alternative B staff goals, two trail maintenance crew members would be sought through sharing with the national or state parks or Nā Ala Hele or through contracts. If these staff positions are achieved over the long term, they will provide expertise needed to complete the linear trail and a system of trails on public lands; the capacity for resource protection; information, maps, interpretation, and education to the public; and training and support to state agencies and local organizations to help them manage, maintain, and monitor trail segments in a manner to protect trail values. Alternative C emphasizes development of the Ala Kahakai Trail Association to become a major partner with the NPS is development, protection, management, and interpretation of the trail, thus expanding operational capacity.

Cumulative Impacts

Operations under alternative C would have long-term moderate to major beneficial cumulative effects on trail resources and values. NPS management of state-owned segments of trail could have long-term beneficial effects on trail management and on the relationship between Nā Ala Hele and the NPS. Long-term moderate to major beneficial effects would result from the Ala Kahakai Trail Association becoming a fully-functioning partner in trail development, protection, management, and interpretation.

Conclusion

Operations under alternative C would have long-term moderate to major beneficial effects on trail resources and values would provide long-term minor benefits through reduced costs.

Unavoidable Adverse Environmental Effects

Alternative A: No Action

Trail fabric and associated archeological, cultural, and historic resources would remain highly susceptible to natural deterioration, inadvertent human damage, and vandalism. It is likely that some important resources would be lost. Increasing unregulated visitor use and potential piecemeal private development along the Ala Kahakai NHT route could contribute to the loss of trail resources.

Alternative B and Alternative C

With proper planning and management, few long-term adverse impacts to trail resources would be anticipated from either of the action alternatives. The physical activities with potential for adverse effect would be installing route markers and interpretive exhibits in areas of public use, limited trail construction and reconstruction, and facility development associated with trailheads. These activities would have a long-term visual impact. With appropriate siting these effects could be minimized, but not done away with; most likely, they would be seen if the viewer is close by. If facilities were located in barren areas or areas of undesirable non-native plants (which would be removed as part of construction), then there would be no effect on native and endemic plant species. Construction activity could result in short-term disturbance of wildlife near construction sites, but construction would be so located that there would be no permanent disturbance. Visitor use could result in temporary displacement of species when people were present. The extent of impacts to vegetation and wildlife would have to be determined on a site-specific basis and cannot be predicted at this time; none are foreseen.

The potential for long-term soil compaction resulting from increased visitor use exists although much of the trail is either on lava or on sand and not readily subject to compaction. Soil

compaction could result in increased run-off and erosion, but again, this is not a major concern in the arid area of the trail.

Short-Term Uses and Long-Term Productivity

Alternative A: No Action

Illegal or negligent uses within the Ala Kahakai corridor could damage or destroy trail segments and associated resources and adversely affect the long-term opportunity to reestablish a continuous trail.

Alternative B and Alternative C

In the long-term, a portion of the *ala loa* and its associated cultural and natural resources would be protected. Any short-term use would contribute to this long-term effect. Recognition and reestablishment of the trail would have negligible effect on the long-term productivity of adjacent land.

Irreversible and Irretrievable Commitment of Resources

Irreversible And Irretrievable Commitment of Resources of Alternative A: No Action

There would be no additional commitment of federal resources under the no action alternative.

Irreversible And Irretrievable Commitment of Resources of Alternative B And Alternative C

It is possible, but highly unlikely, that over time and with effort and funds, any trail segments or facilities which would be constructed for the Ala Kahakai NHT could be removed and the land restored. Even though most developed areas could be restored to previous condition over time, the use of the land and financial resources to implement this alternative would, in a practical sense, be an irretrievable commitment of resources. In areas that were restored, the biological productivity would be expected to increase.

While this category of impacts is concerned with biological resources, the primary benefit of trail designation would be its enhanced protection and reestablishment of the ancient and historic trail. Reversal of this process would be counter-productive even if, by some measure, it might increase biological productivity to do so.

The Environmentally Preferred Alternative

The environmentally preferred alternative causes the least damage to the biological and physical environment. It is also the alternative that best protects, preserves, and enhances historic, cultural, and natural resources. It is the alternative that will promote the national environmental policy expressed in NEPA (§101(b)) and includes:

1. Fulfilling the responsibilities of each generation as trustee of the environment for succeeding generations;
2. Ensuring for all Americans safe, healthful, productive, and esthetically and culturally pleasing surroundings;
3. Attaining the widest range of beneficial uses of the environment without degradation, risk of health or safely, or other undesirable and unintended consequences;
4. Preserving important historic, cultural and natural aspects of our national heritage and maintaining, wherever possible, an environment that supports diversity and variety of individual choice;
5. Achieving a balance between population and resource use that will permit high standards of living and a wide sharing of life's amenities; and
6. Enhancing the quality of renewable resources and approaching the maximum attainable recycling of depletable resources. (The planners determined criteria six to be inapplicable to this planning effort.)

Alternative C (the preferred alternative) is the environmentally preferred alternative because it surpasses the other alternatives in the potential to realize the full range of national environmental policy goals. It provides a high level of protection of natural and cultural resources while also providing for a wide range of neutral and beneficial uses of the environment. This alternative maintains an environment that supports a diversity and variety of individual choices. It integrates resource protection with an appropriate and more diverse range of Native Hawaiian, resident, and visitor (tourist) uses than the other two alternatives. It provides the potential to go beyond the protection of singular archeological and cultural sites and individual species to protect cultural landscapes and plant and animal habitat on public land. This alternative provides greater sharing of the culture of Hawai'i with visitors and better protection of traditional uses of the environment by Native Hawaiians than the other alternatives.

Alternative A, which describes the current and potential administration and management of the Ala Kahakai NHT under existing conditions, fails to satisfy the NEPA requirements outlined above. Shortage of staff, programs, and interpretive services limit existing staff to minimal operational effectiveness. The first two goals are limited to the four national parks, a few trail segments, and in the future, sites on the auto tour. The third and fourth goals are unlikely to be attained without additional funding and increased public support. Resource impacts would be expected to increase along most of the trail corridor as few trail segments would be brought under the administration of the NPS. Under this alternative, the fifth goal remains unattainable due to population increase, development pressures, and increased use of the trail route without a management presence.

Alternative B would meet the national policy goals but at a lower level than alternative C, the preferred alternative. It would care for the environment of the trail for future generations, but would not preserve examples of the traditional Hawaiian system of trails as does alternative C (goal 1). It provides for healthful and culturally pleasing experiences along a linear trail, but does not provide for the broader scope of experience of alternative C (goal 2). It provides a wide range of beneficial uses of the environment, but alternative C provides additional settings in which the Native Hawaiian culture can be more broadly experienced (goal 3). It better protects the trail environment and provides for a greater range of user experiences than alternative A, but the area protected and the diversity of choices is less than the preferred alternative (goal 4). While both alternatives B and C provide a balance between population and resource use through carrying capacity evaluation, alternative B does not provide the wide sharing of life's amenities potential in alternative C through its cultural conservation programs (goal 5).

Keolonahihi, N. Kona, NPS photo