

Kaua'i National Wildlife Refuge Complex

Kīlauea Point National Wildlife Refuge Comprehensive Transportation Planning Study



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John A. Volpe National Transportation Systems Center

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Commonly Used Acronyms and Abbreviations

A

ATS Alternative transportation systems

C

CCP Comprehensive Conservation Plan

CFLHD Central Federal Lands Highway Division

D

DMS/VMS Dynamic or Variable Message Sign

F

FHWA Federal Highway Administration

FHWA-CFLHD Federal Highway Administration Central Federal Lands Highway Division

FLAP Federal Lands Access Program

FLTP Federal Lands Transportation Program

FR Federal Register

H

HAWK High Intensity Activated CrossWalk

HDOT Hawai'i Department of Transportation

I

ITS Intelligent Transportation Systems

K

KPNWR Kīlauea Point National Wildlife Refuge

KNWRC Kaua'i National Wildlife Refuge Complex

L

Lighthouse Daniel K. Inouye Kīlauea Point Lighthouse

M

MLTP Multimodal Land Transportation Plan

MUTCD Manual on Uniform Traffic Control Devices

N

NEPA National Environmental Policy Act

NWR National Wildlife Refuge

R

Refuge Kīlauea Point National Wildlife Refuge

T

TAG Transportation Assessment Group

TRIP Paul S. Sarbanes Transit in Parks

TROS Transportation Recreational Opportunity Spectrum

U

U.S. DOT U.S. Department of Transportation

USFWS U.S. Fish and Wildlife Service

USGS U.S. Geological Survey

V

Volpe Center U.S. Department of Transportation's John A. Volpe National Transportation Systems Center

Executive Summary

Kīlauea Point National Wildlife Refuge (KPNWR or Refuge) is a popular destination for both residents and visitors to Hawai'i, drawing more than 500,000 people annually to its scenic overlooks, wildlife, historic Daniel K. Inouye Kīlauea Point Lighthouse (Lighthouse) and ocean views. An increase in the intensity of visitation and an associated increase in congestion entering the Refuge prompted the U.S. Fish and Wildlife Service (USFWS) to find solutions to ease ongoing traffic-related problems.

Traffic congestion on roads and in parking lots has caused safety concerns for Refuge visitors, staff, and wildlife alike. Additionally, the Refuge shortened its operating hours due to budget constraints, further exacerbating congestion as overall visitation remained the same. Having undergone a number of transportation planning studies in the past, the Refuge is ready to move forward with implementing strategies to solve these issues.

In 2006, an alternative transportation system (ATS) study was conducted for KPNWR under the guidance of Federal Highway Administration's Central Federal Lands Highway Division (CFLHD). In October 2009, the U.S. Department of Transportation's John A. Volpe National Transportation Systems Center (Volpe Center), with assistance from CFLHD, led a Transportation Assessment Group (TAG) visit that examined transportation issues throughout the Kaua'i National Wildlife Refuge Complex (KNWRC). The TAG recommended a comprehensive transportation study to assess current deficiencies, problem areas, safety issues, and transportation needs, and to explore and propose the best transportation management solutions for the complex. The Refuge applied for and received a fiscal year 2010 planning grant from the Federal Transit Administration's Paul S. Sarbanes Transit in Parks (TRIP) program to conduct the work.

Working with the USFWS, a project team composed of staff from the Volpe Center and CFLHD evaluated the existing conditions of transportation infrastructure on the Refuge and in the region and then analyzed the feasibility of implementing transportation strategies included in the Refuge's Comprehensive Conservation Plan (CCP). These strategies include implementing a visitor shuttle service, improved visitor information, fee change/structures, parking management, temporary traffic control measures, intelligent transportation systems (ITS), and non-motorized access to the park.

The project team analyzed these strategies and recommended a set of short-, medium-, and long-term actions for implementation. Over the course of the project, the team also led several on-site stakeholder meetings and participated in public meetings in the County of Kaua'i. The recommended actions, as well as the existing conditions reports, are included here as a final report that draws upon the feedback of Refuge staff, stakeholders, and visitors to create sustainable transportation solutions.

Chapter I: Introduction



Kaua'i National Wildlife Refuge Complex (KNWRC) in Hawai'i consist of three National Wildlife Refuges (NWRs) on the Island of Kaua'i: Kīlauea Point National Wildlife Refuge (KPNWR or Refuge), Hanalei National Wildlife Refuge, and Hulē'ia National Wildlife Refuge. KPNWR is located on the northernmost tip of Kaua'i near the town of Kīlauea and is one of the most highly visited refuges in the entire NWR system. Hanalei NWR, five miles west of KPNWR near the town of Hanalei, is not accessible to the public, but KNWRC manages a highway pull-off area with several interpretive panels that overlooks the Refuge. Hulē'ia NWR is near the Kaua'i County seat of Līhu'e and is not accessible to the public.

This report explores opportunities and provides recommendations to alleviate traffic congestion and enhance visitor safety for the U.S. Fish and Wildlife Service (USFWS) Kīlauea Point National Wildlife Refuge.

The KNWRC CCP

This Comprehensive Transportation Planning Study is intended to inform transportation implementation plans and actions included in the KNWRC Comprehensive Conservation Plan (CCP). A CCP sets forth management guidance for a Refuge for a period of 15 years, as required by the National Wildlife Refuge System Administration Act (16 U.S.C. 688dd -688ee, et seq.) (Refuge Administration Act) and as amended by the National Wildlife Refuge System Improvement Act of 1997 (Public Law 105-57) (Improvement Act). The Refuge Administration Act requires CCPs to identify and describe:

- The purposes of the Refuge;
- The fish, wildlife, and plant populations; their habitats; and the archaeological and cultural values found on the Refuge;
- Significant problems that may adversely affect wildlife populations and habitats and ways to correct or mitigate those problems;
- Areas suitable for administrative sites or visitor facilities; and
- Opportunities for fish and wildlife dependent recreation.

Previous Studies

KPNWR's transportation challenges have been studied extensively over the years. This report builds upon several of these studies, which are summarized below.

Cambridge Systematics. *Field Report: Kīlauea Point National Wildlife Refuge*. Appendix C of the Federal Lands Alternative Transportation Systems Study Summary of National ATS Needs. August 2001; 15 pages.

This field report describes the existing transportation, community development, and natural and cultural resource conditions, issues, and concerns at the Refuge. The report also describes planning and coordination issues and assesses the Refuge's need for an alternative transportation system (ATS). The report concludes that the Refuge could be a candidate for expanded ATS, either separately or in conjunction with a broader system serving the North Shore of Kaua'i, including the Hanalei NWR.

USGS. *Visitor and Community Survey Results for Kīlauea Point National Wildlife Refuge and Lighthouse: Completion Report*. 2005; 226 pages.

This report summarizes the results of a visitor and community survey and an economic analysis that were performed to quantify visitor and community resident perceptions, recreation use values, and the economic impacts such as on local income and the employment effects of

potential ATS management options. Survey respondents were asked to provide information on the type of economic and social benefits they derive from KPNWR. Respondents also were asked to provide their perceptions on access to the Refuge, on the Refuge experience, and indicate their willingness to pay for certain services and/or ATS options at the Refuge.

County of Kauaʻi. *Kīlauea Town Plan*. September 2006; 80 pages.

This draft plan describes the town and its vision for growth. With regard to transportation and the Refuge, this draft states, “From the standpoint of the Kīlauea community’s interests, the preferred alternative is to manage visitor demand at KPNWR by using entry fees and other measures, such as requiring advance appointments in certain instances, and make only modest changes to parking and transportation arrangements rather than to take steps that may promote increased visitation to KPNWR.” Furthermore, “During the planning charrette at the end of February 2005, affordable housing was identified as the top issue, followed by transportation issues (mostly related to vehicular through-traffic) and natural and cultural resource preservation. At the end of the charrette, a conceptual plan consisting of the basic components of a town expansion area and a new entry road to town from the highway was presented.”

Parsons Brinckerhoff Quade and Douglas, Inc. *Kīlauea Point National Wildlife Refuge Alternative Transportation Systems Study*. For the U.S. Fish and Wildlife Service. September 2006; 139 pages.

This report explores alternatives to the existing transportation system that currently provides access to and circulation within KPNWR. The report also establishes the initial “purpose and need” for transportation improvements and evaluates the feasibility of five conceptual transportation alternatives, including two that incorporate transit “shuttle” elements. The report concludes that multiple alternatives (including transit alternatives) are feasible, discusses the advantages and disadvantages of each alternative, the possible integration and/or phasing of alternatives, and recommends proceeding to the NEPA environmental evaluation phase of the ATS Study. Recommendations for short-, medium-, and long-term transportation improvements are included.

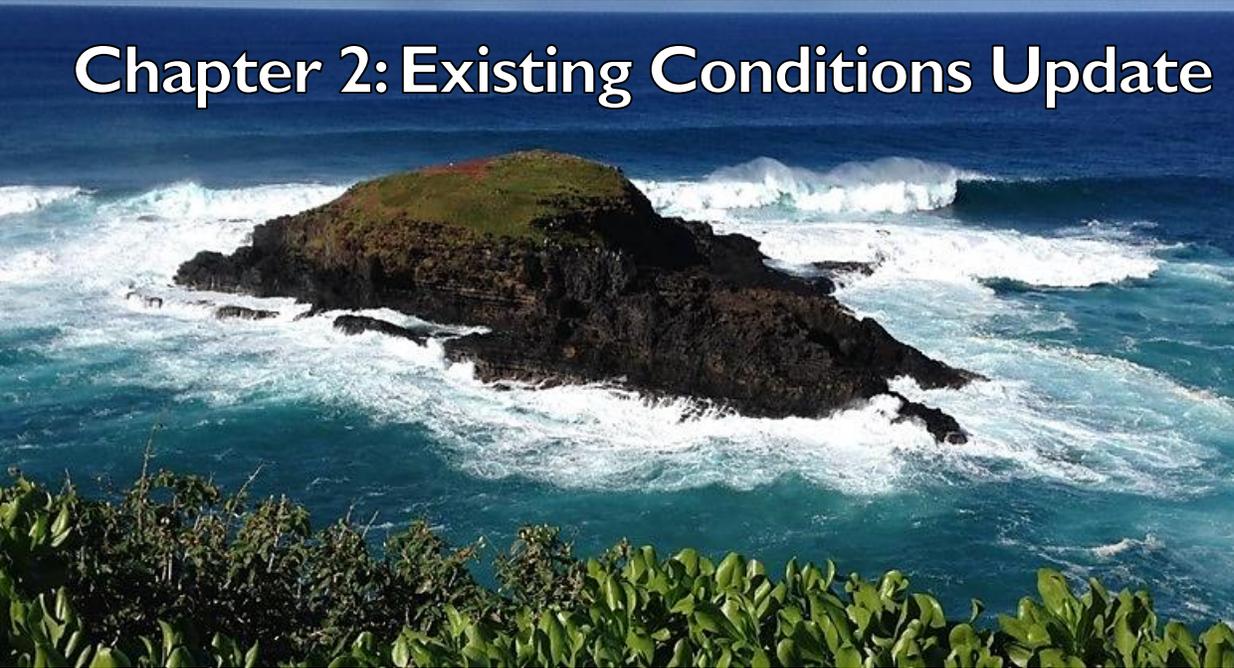
Interagency Transportation Assistance Group (TAG). *Transportation Observations, Considerations, and Recommendations for Kīlauea Point National Wildlife Refuge*. October 2009; 44 pages.

Funded by the Paul S. Sarbanes Transit in Parks Program, the TAG report was prepared by a team of transportation professionals subsequent to a three-day site visit and documents the conditions observed, transportation issues and considerations, and recommendations arising from the TAG team’s analysis.

Charlier Associates. *Multimodal Land Transportation Plan: Planning for a Sustainable Transportation System in Kauaʻi County through 2035*. Adopted by Kauaʻi County Council January, 2013; 137 pages.

The County’s first Multimodal Land Transportation Plan (MLTP) serves as the plan for county roads and streets, public transit, bicycle facilities, pedestrian facilities, agricultural needs, and as a means to integrate land use planning with transportation system development. The plan will be used to guide policies, ordinances, the allocation of transportation funding, the prioritization of transportation projects, and future transportation plans throughout the County.

Chapter 2: Existing Conditions Update



Introduction

Understanding existing conditions is essential in the development of a comprehensive transportation planning study because it describes the components for analyzing the feasibility of implementing the preferred alternative of the CCP. The Existing Conditions Update concentrates on the current state of transportation and visitor access to KPNWR and associated impacts on Kīlauea Town. As discussed in Chapter 2 of this report, access management to KPNWR and the surrounding community has been the subject of several studies during the past decade because of an increase in visitation and related impacts to safety, visitor experience, and natural and cultural resources. Many of these studies assess existing conditions, and the information in this chapter synthesizes their findings. Additionally, some conditions have changed in recent years, so the latest available information through September of 2015 is included in this chapter.

The final section of this chapter addresses existing conditions at the two other stations that comprise KNWRC, Hanalei NWR and Hulē'ia NWR. Additionally, a regional transportation analysis (Chapter 3) addresses island-wide transportation conditions as they pertain to tourism, visitor travel options, access to popular destinations, and coordination with Kaua'i County and Hawai'i Department of Transportation (HDOT) transportation planning, public works, and project development.

KPNWR Description

Located 23 miles north of the county seat of Līhu'e (population 6,455) and two miles north of the town of Kīlauea (population 2,248), KPNWR (Figure 1) was established in 1985 to preserve and enhance 191 acres of seabird nesting colonies. It provides habitat for the endangered Nēnē, other migratory birds, the endangered 'Īlio-holo-i-ka-uaua or Hawaiian Monk Seal, and native coastal plant communities such as the Naupaka kahakai, 'ilima, and 'akoko. The focus of management activities at KPNWR is to expand and enhance existing habitat for these species and to combat invasive plant species and predators while balancing biological resources with public uses.

In addition to wildlife, Kīlauea Lighthouse is a major attraction of KPNWR. Built in 1913, the historic structure was once owned and operated by the U.S. Coast Guard and is on the National Register of Historic Places. On Wednesday and Saturday, during Refuge operating hours, the lighthouse is open to the public. There is also a Nature Store at the Refuge managed by the Kīlauea Point Natural History Association, a non-profit friends group for the Refuge.

The Kīlauea Point Overlook, which is located just outside KPNWR's main entrance at the dead end of county-owned Kīlauea Road, is another important visitor destination. The overlook offers panoramic views of Kīlauea Point and the lighthouse and interpretive panels. Visitors do not have to pay an entrance fee to visit the Overlook and there are minimal visitor facilities.

The Refuge also owns Kāhili Quarry to the east of Kīlauea Point, but it is not within the scope of this report.

Transportation and Visitation Issues

The following transportation-related issues have been identified through previous studies and in stakeholder interviews from 2014 and will be discussed in this document.

- There is insufficient parking compared to the demand.
- The Refuge has concerns about traffic congestion at the Refuge entrance near the overlook, which can be challenging to manage due to the narrow entrance road and finite number of vehicles allowed in the Refuge at one time.
- There is no way to enter the Refuge using alternative transportation. Bicycles, pedestrians, and large passenger vehicles are all prohibited from traveling the entrance road.
- Circulation problems within the Refuge parking area create conflicts between cars going different directions and between pedestrians and cars.
- Paid visits to the Refuge are typically short (average 40 minutes per visit), and the Refuge is open six hours per day, five days per week. Short casual visits and fewer operating hours often result in higher traffic levels.
- Refuge staff estimate that half of all visitors pass through the gate, reach the fee booth, and pay the entrance fee; others remain at the overlook or leave when space is not available in the Refuge parking area.
- Topography surrounding the fee booth prevents circulation between the upper and lower parking areas within the Refuge.
- Refuge transportation facilities are constrained by the surrounding environment, and there is little room for significant parking expansion within the Refuge gate.
- Visitation is expected to grow on the island and to the Refuge and the travel modes of visitors is expected to change as tourism officials expect more international visitors who may travel with guided tours. This new demand may stretch the ability of the Refuge to provide access and interpretation to these visitors because of the transportation constraints on the road leading into the Refuge.

Refuge Goals

In the Comprehensive Conservation Plan, KPNWR has articulated six management goals to guide its operation:

Goal 1: Protect, enhance, and manage the coastal ecosystem to meet the life-history needs of migratory seabirds and threatened and endangered species.

Goal 2: Restore and/or enhance and manage populations of migratory seabirds and threatened and endangered species.

Goal 3: Gather scientific information (surveys, research, and assessments) to support adaptive management decisions under objectives for Goals 1-2.

Goal 4: Visitors and kama'āina of all ages and abilities feel welcome, enjoy a safe visit, and are provided high-quality opportunities for environmental interpretation and education, wildlife observation, and photography, which allow them to connect with the wildlife, habitats, and cultural and historic richness of the Refuge.

Goal 5: Identify, protect, evaluate, and interpret the cultural (including historic) resources and heritage of the Refuge while consulting with Native Hawaiian organizations and preservation partners and complying with historic preservation legislation.

Goal 6: All visitors enjoy safe and well-maintained operations that contribute to a positive visitor experience.

While a high quality visitor experience is important to the Refuge, it is not its only mission. This report pays attention to the visitation aspects of the Refuge's activities but remains cognizant of the other goals described above.

Visitation Summary

KPNWR received 189,275 visitors who checked in at the fee booth during Fiscal Year (FY) 2015. Refuge staff estimates that this number is approximately half of the Refuge's total visitation, accounting for visitors to the Overlook who do not pay an entrance fee.

The Visitation Summary identifies current quantitative and qualitative data to inform Refuge transportation planning, including operating hours, visitation trends, special events, traveler information, visitor impacts, and visitor satisfaction.

Refuge Operating Hours

Prior to early 2014, KPNWR was open to visitors seven days per week from 10:00 AM until 4:00 PM. In an effort to reduce operating costs, Refuge management reduced visiting days to five days per week (Tuesday through Saturday) starting February 2014. Impacts to Refuge operations from the change in visiting hours have only begun to be understood, but staff have indicated that Tuesday mornings now see some of the heaviest demand, presumably because visitors have waited an extra day to come to the Refuge. The Refuge has also been experiencing greater daily demand because visitors can only visit on five days per week.

Entrance Fees

The regular fee to enter the Refuge has been \$5 per person since 2010. Prior this it was \$4 between 2008 and 2010, and \$3 prior to 2008. However, not all visitors pay an entrance fee. In 2015, only 64 percent of all visitors paid the \$5 entrance fee. The remaining visitors held annual passes (Kama'āina pass for locals, Duck Stamp, Senior, Access Pass, and Military) or were children under 15 to whom the Refuge does not charge admission.

Visitation Trends

Visitation numbers since 2006 reflect a clear seasonal pattern to visitation with roughly 50 percent difference between the busy winter months of February and March and the low season of September and October (Figure 2). Refuge visitation peaked during the winter of 2007 and then decreased slightly during the economic downturn between 2008 and 2011. Since 2011, visitation has grown and is approaching 2007 levels (Figure 3).

Refuge visitation data only reflect visitors that entered the Refuge and paid an entrance fee. Data is not available for visitors that only visit the Overlook since no payment is required; however, Refuge staff estimate that total visitation would double if this group of visitors is counted based on the Parsons Brinckerhoff study.

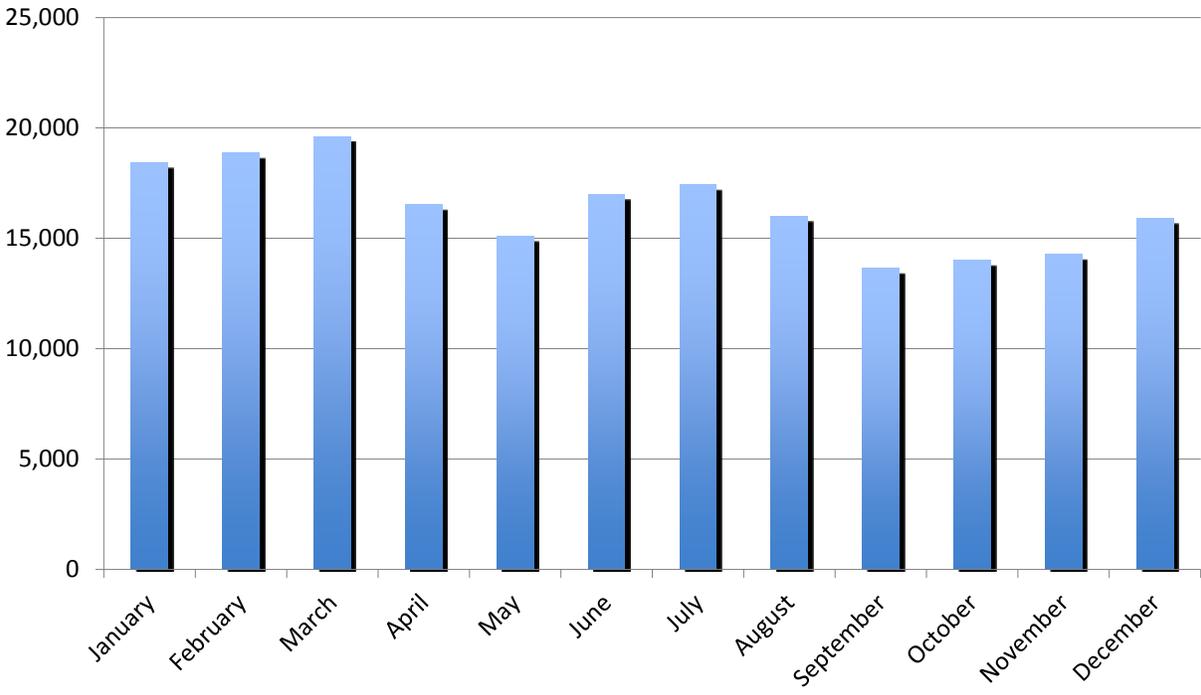


Figure 2: Average monthly visitation, FY 2006-2015

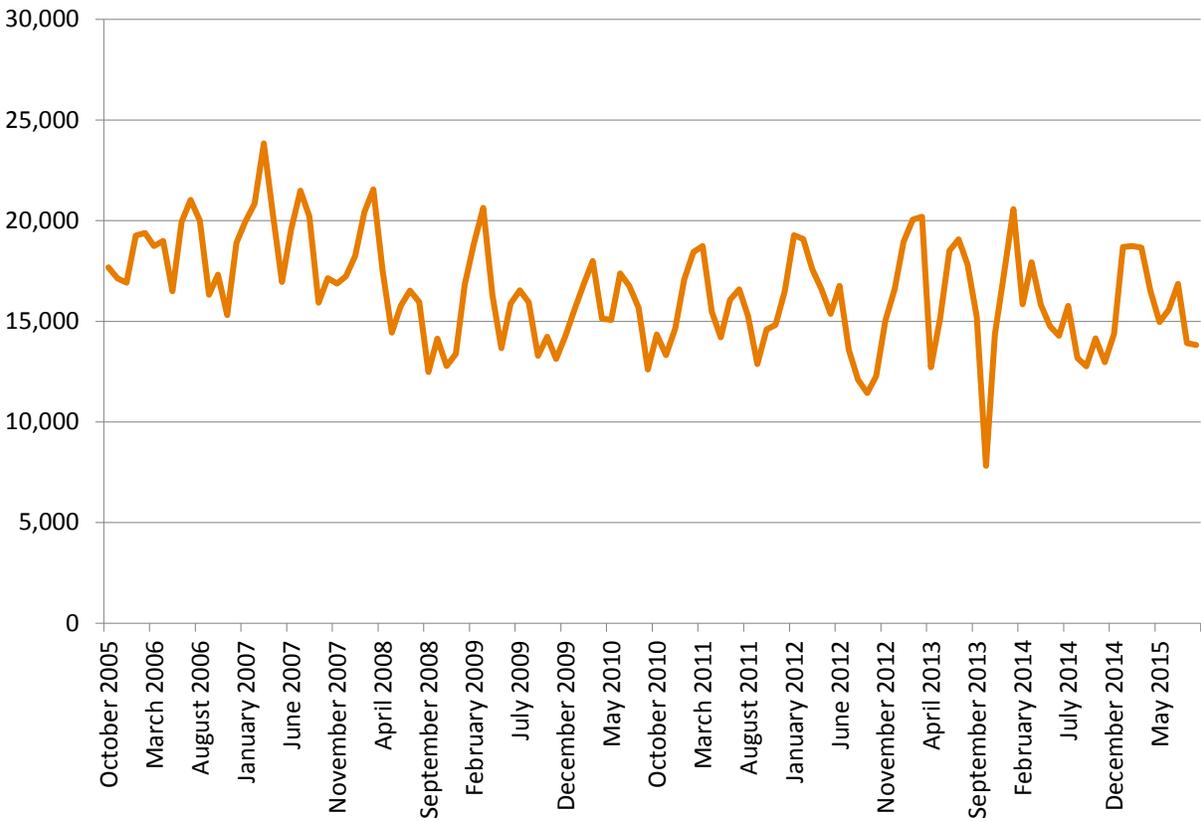


Figure 3: Total monthly visitors, FY 2006-2015

Between FY 2006 and FY 2015, the average annual daily visitation has hovered between 510 and 770. However, it is important to note that visitation can fluctuate significantly between days throughout the

year. Each year between FY 2006 and FY 2015, the Refuge had regular operating days with fewer than 300 visitors and days with more than 800 visitors (Figure 4). For special events, the number of visitors in one day can reach well over 1,200. Since the Refuge reduced its operating days to 5 from 7 in February 2014, average daily visitation has increased to its highest levels yet seen (766 in FY2015). This increase in daily visitation has put great strain on Refuge staff that must dedicate significant resources to managing the resulting congestion.

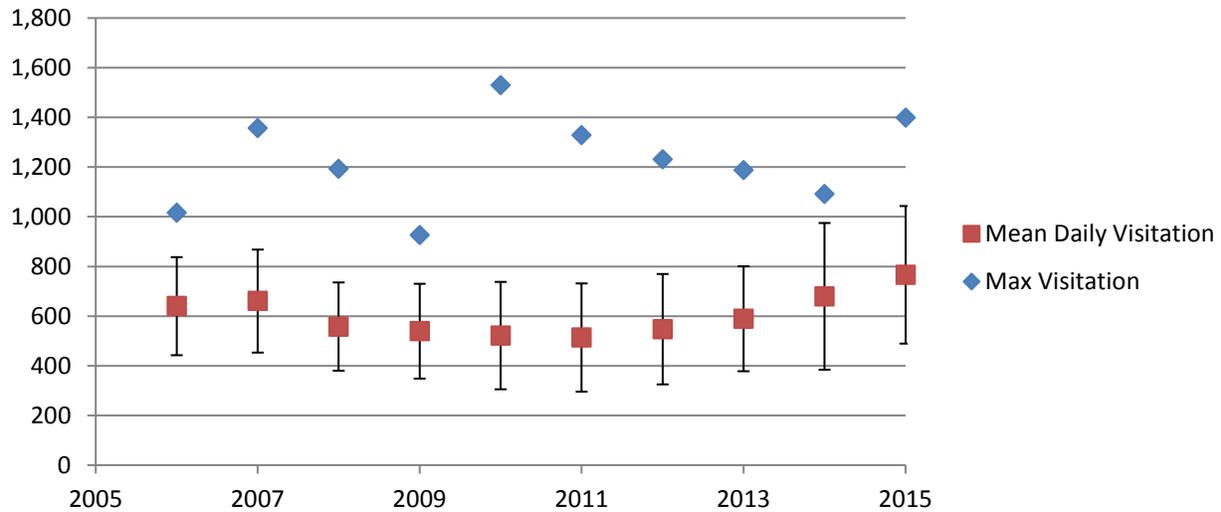


Figure 4: Average daily visitation and maximum visitation (with 95% range), FY 2006-2015

Based on Refuge data from 2005 to 2010, a slightly higher percentage (55-60 percent) of visitors arrive between 10:00 AM and 1:00 PM than arrive between 1:00 PM and 4:00 PM. Visits average 40 minutes in duration. According to the 2010 and 2011 U.S. Geological Survey (USGS) Visitor Survey, 96 percent of visitors arrived by private vehicle, and only 2 percent arrived by chartered tour bus.¹

Refuge Visitor Programs/Special Events

The KPNWR hosts environmental education programs for schoolchildren who arrive by chartered school bus. The Refuge only allows 25-passenger or smaller school buses into the Refuge except for the special Albatross Lifecycle Program field trips for second graders in April, when larger school buses are permitted to enter the Refuge.

Traveler Information

The historic lighthouse is identified on most publicly available maps of the island. As visitors drive along Kūhiō Highway, the intersection of Kolo Road to the town of Kīlauea is marked in both directions with a standard green directional sign to Kīlauea Point Lighthouse (Figure 5). Upon entering the town of Kīlauea, drivers encounter several handmade directional signs pointing visitors toward the lighthouse such as the one at the corner of Kolo Road and Kīlauea Road (Figure 6). Further down Kīlauea Road before leaving Kīlauea Town, one final official green sign indicates that the Kīlauea Lighthouse is straight ahead. If drivers continue straight along Kīlauea Road, they will eventually end up at the Overlook and the Refuge entrance gate.

¹ USGS Visitors Survey (2011)



Figure 5: Sign on westbound Kūhiō Highway



Figure 6: Unofficial directional sign for the lighthouse

None of the existing signs and few maps directed at tourists visiting the island mention anything about the USFWS or the name of the wildlife refuge. Many visitors to the overlook are not made aware that the area is a national wildlife refuge and that the area is managed and protected by the USFWS.

Visitors have few sources of information about the hours of operation of the Refuge or that the Refuge is sometimes unable to accommodate additional vehicles. When the Refuge changed its visiting hours to five days per week, the Refuge was able to work with HDOT to temporarily install a digital messaging sign along Kūhiō Highway alerting drivers of the Refuge’s new hours of operation. This digital sign was removed several weeks after the new hours were implemented.

According to the USGS visitor survey in 2010 and 2011, 35 percent of visitors learned about the KPNWR from the sign on Kūhiō Highway, and 73 percent used the navigational sign to find the Refuge, while 19 percent used a navigation system.²

Impacts of Visitation on Refuge Mission

During busy times of the year such as the spring months, the Refuge must assign several staff members to direct traffic at the Overlook and at the parking area inside the Refuge property. While visitation can pose some problems for the Refuge, it is also a source of revenue for the KNWRC and provides an opportunity for the USFWS to explain the importance of preserving Kauaʻi's biodiversity and the protection of the state bird, the Nēnē. In addition, the KNWRC provides important cultural and historic interpretation including preserving and providing access to the historic lighthouse. The USFWS also provides wildlife and cultural interpretation at the Hanalei NWR overlook. Many visitors to Kauaʻi have little knowledge of the island's unique ecology or the history and culture of native Hawaiian people, and the KNWRC provides some of the only sources of this information to visitors in the form of interpretive signage at the Refuge overlooks.

Visitor Satisfaction

The USGS conducted a survey of visitors to KPNWR to collect data on visitor experiences at the KNWRC. Among the findings from the survey of 265 visitors to KPNWR in 2010 and 2011 were:

- Overall visitor satisfaction about the activities available at the Refuge was extremely high with the only activities receiving medium satisfaction being opportunities for hunting and fishing, kayak/canoe, and bicycling, and visitors did not assign high importance to these areas.
- 81 percent of visitors felt that the fee paid was appropriate while 11 percent felt it was too high.
- 75 percent of visitors felt that the value of the experience was at least equal to the fee paid, while 10 percent disagreed.

This survey indicates a high degree of satisfaction among visitors to the Refuge with the facilities they encountered and their experience there. It also indicates a willingness to pay a higher fee to enter. One limitation of the survey was that it only included individuals who paid entrance to the Refuge. Those that only visited the Overlook or who entered the Refuge but did not leave their car were not surveyed.

Summary of Visitation Issues

Through previous studies and through stakeholder interviews from summer 2014, the following aspects of visitation to the Refuge may affect transportation and access management decisions over the coming years.

- According to tourism officials and business owners in the area, while visitation to the island decreased during the recent economic downturn, **visitation to Kauaʻi and to KPNWR is expected to grow and the profile of visitors is expected to change.** The island has pursued a fairly slow growth strategy as compared to other Hawaiian islands, but there are a number of developments in the works that should increase visitation. In addition, more part-time residents of the island are using vacation rental services to rent their homes. This development is increasing the number of visitors who can be accommodated on the island beyond hotels. It is also complicating the efforts of reaching visitors with information and transportation services as they do not use concierge services or hotel shuttle tours.

² USGS Visitors Survey (2011)

- **Visitors to KPNWR only stay for an average of 40 minutes.** Most paid visits to the Refuge are fairly casual in nature in that visitors stop through for a short walk around the grounds and get back in their vehicles to see other sights on the island.
- **The Refuge hours of operation are only six hours per day, five days per week.** These operating hours and the fact that visits are typically short mean that visitation is fairly concentrated and sometimes results in crowding at the Refuge. Since the Refuge reduced its operating hours in early 2014, it has experienced more crowding as more visitors attempt to visit in a shorter time span.
- Refuge staff estimates that **only half of all visitors to Kīlauea Point enter the Refuge and check in at the fee both.** The remaining visitors stop at the Overlook to take in the view of Kīlauea Point and the lighthouse from the end of Kīlauea Road and stay for less than 20 minutes.
- Of those who enter the Refuge, **only 60-70 percent of visitors pay an entrance fee,** the rest of the visitors are children under 15 or hold annual passes.
- **Official signage for KPNWR on the island is limited to only two major signs on Kūhiō Highway,** and two very small directional signs on Kīlauea Road. These signs, as well as several unofficial signs in the town, direct visitors to the lighthouse. None mention the USFWS.

KPNWR Transportation Facilities

Due to its small footprint and steep coastal terrain, KPNWR’s transportation facilities are very limited. The following section describes the transportation facilities that are currently in service (Figure 7) and discusses limitations to these facilities.



Figure 7: The built environment at KPNWR

Entrance Road

Between the entrance gate and a series of Refuge parking areas, a paved, 16-foot-wide road travels for approximately 1,500 feet over a steep grade with several tight curves. The road is open in both

directions to small vehicles only, as there is no sidewalk, shoulder, or bike lane (Figure 8). The road is also too steep, curvy, and narrow to accommodate buses.



Figure 8: No pedestrians allowed on Refuge entrance road

Refuge Parking Areas

KPNWR includes approximately 50 total parking spaces available to the public. Twenty of these are in a lower parking area, thirteen in an adjoining upper parking area, and fifteen spaces in an overflow parking area. Circulation within the upper and lower parking areas is challenging as vehicles must enter and exit each parking area from the same point through a narrow channel that can be congested at busy times. A connecting driveway (Figure 9) that used to connect the parking areas had to be closed to vehicles to protect pedestrian safety, thereby eliminating the possibility of one-way travel in the parking area. The current operation is adequate during less busy times at the Refuge but creates more conflicts between vehicles and between vehicles and pedestrians during the times when there is a surge in visitation.



Figure 9: Connection from lower parking lot to upper parking lot

Pedestrian Path

Beyond the parking areas and a fee booth, a pedestrian pathway guides visitors approximately 600 feet from the parking area to the Kīlauea Lighthouse on Kīlauea Point. The Refuge offers mobility assistance with electric vehicles for those who are unable to walk (Figure 10).



Figure 10: Electric passenger vehicle operated by the Refuge

Overlook Parking Area

At the end of Kīlauea Road at the Kīlauea Point Overlook, five official parking spaces are provided for Overlook visitors (Figure 11). Additionally, unofficial parking is available on the side of Kīlauea Road for as many as 40 vehicles, depending on parking configuration.



Figure 11: Overlook parking area

Summary of Transportation Issues within the Refuge and at the Overlook

The following aspects of transportation at KPNWR pose challenges for the Refuge in offering a safe and enjoyable visitor experience while maintaining the core mission of protecting wildlife and other natural resources.

- At busy times **the official parking area becomes congested** forcing cars to park on grassy areas that are Nēnē habitat.
- During busy times, **the Overlook area near the entrance to the Refuge is also congested.** However, there is a bit more overflow space for parking.
- There can be **conflicts between vehicles** at the Refuge because of crowding and poor circulation.
- When the Refuge parking lot is full, **vehicles get backed up along the driveway** inadvertently trapping visitors unaware of the congestion and blocking the road from access by emergency vehicles should one be needed.
- There are **no bicycle facilities within the Refuge** and bicycles are prohibited from using the entrance road. The driveway is also **unable to accommodate large passenger vehicles.**
- **The location of the fee booth poses problems to circulation** in that it hinders the ability to connect the two parking areas by roadway. This connection is made more complex by the topography and issues with sightlines between the lower and upper parking areas.
- There is a **constrained footprint to the Refuge transportation facilities** inside the gate. The area near the parking lots is prime Nēnē nesting habitat and there are also concerns about erosion. The Refuge does not have room within its land holdings to expand parking within its boundaries.

Access to KPNWR

Owned and maintained by Kaua'i County, Kīlauea Road is the only road that provides access to KPNWR. From its intersection with Kolo Road, Kīlauea Road travels approximately 1.5 miles through the center of Kīlauea Town and northward on its way to the Refuge. With fewer than 2,000 permanent residents, the shops and restaurants in the center of Kīlauea Town rely heavily on visitors traveling on Kīlauea Road, many of whom are passing through town on the way to Kīlauea Point.³

Existing Transportation Concerns

High visitation and associated congestion concerns at KPNWR have repercussions that are felt along the length of Kīlauea Road, which have been documented in previous studies and revealed during interviews with stakeholders in June 2014.

- **Heavy traffic volumes are in part due to the fact that 20-25 percent of all traffic is bound for the Refuge** according to HDOT traffic counts from 2010. Stakeholder interviews revealed that some residents within the community feel that the Refuge traffic negatively impacts the quality of life and poses safety concerns for residents.
- Stakeholder interviews revealed that there is a **perception that visitors to the Refuge often drive too fast** along Kīlauea Road.
- There is a **lack of traveler information directing visitors to the Refuge** with only one highway sign on Kūhiō Highway and two directional signs within the town.
- **No signage and public information about the Refuge mentions the USFWS** and instead only calls attention to the historic lighthouse.
- Business owners in the town feel that the **health of their businesses and the Refuge are interconnected** and they would like to make sure that visitors are aware of the commercial services offered in town.
- There is **no bicycle or pedestrian access to the Refuge area** though bicyclists and pedestrians do occasionally use the roadway to access it. There is a pathway that runs alongside Kīlauea Road for much of the length between the town and the Refuge but it is not in excellent condition, is narrow and does not connect to the Refuge directly.
- **Tour buses are prohibited from accessing the Refuge roads** because of their size and the narrow roads and parking areas.
- **There is no transit service that serves the Refuge.** Kaua'i Bus offers regular service only to the park and ride at the Anaina Hou facility, the food mart at the intersection of Kolo Road and Kūhiō Highway, and the Kīlauea gym near the center of town.

The fact that the vast majority of visitors to the Refuge must access it by means of private automobile also means that Kīlauea Road (Figure 12) receives more traffic during the hours when the Refuge is open than when it is providing access only to the town and surrounding area residents. HDOT traffic counts taken in 2010 showed roughly 1,800 vehicles per day using the end of the road near the Refuge entrance and one residential access road. The busiest part of Kīlauea Road is near the highway entrance receives close to 6,000 vehicles per day.

New and proposed developments

Kīlauea Town has pursued a slow growth development strategy, which is reflected in both the Kīlauea Town Plan and the Kaua'i County General Plan. Nevertheless, some significant development concepts have advanced in recent years.

³ Interagency Transportation Assistance Group (2009)

- The Hunt Development Group has submitted plans to Kauaʻi County for a shopping center at the intersection of Keneke Road with Kīlauea Road in the center of Kīlauea Town. As part of this development proposal, a traffic analysis was completed to address anticipated impacts to traffic on Kīlauea Road and the surrounding neighborhood during peak traffic hours.⁴The analysis estimated that the shopping center would attract 87 vehicles during the AM peak hour and 177 vehicles during the PM peak hour and most would use Kīlauea Road as the proposed bypass road would is still conceptual in nature. Work on this development would start no earlier than late 2016.
- Kauaʻi County recently entered into an agreement with a private non-profit enterprise to create an agriculture park on 75-acre parcel on the east side of Kīlauea Road near its intersection with Kahili Quarry Road. This agricultural park will be used as an educational community facility to encourage local farming. A farmers’ market may also be located on site and parking facilities for visitors are currently planned. Work on this development has just begun in 2016.
- The Anaina Hou Community Park is a new, multi-use attraction located across Kūhiō Highway from the town just west of the intersection with Kolo Road. The attraction consists of a playground, skatepark, walking trail, miniature golf course, Kauaʻi Bus Park and Ride facility, bike rental, weekly farmers’ market, and café. Anaina Hou plans to add a conference facility, theater, outdoor pavilion, and commercial kitchen to its facilities. Work on these additions have only recently started and are expected to be complete in two or three years.

In addition to new commercial and community facilities, opportunities for residential growth have gained momentum due to the increasing cost of living in and around Kīlauea Town. The Kīlauea Town Plan indicates an area north and west of the center of town as an area capable of absorbing medium- to high-density residential development. This privately held area makes sense to consider new development in part due to a proposed bypass road (see next section) that the Kīlauea Town Plan officially endorses.⁵

New and Proposed Transportation Infrastructure

As a result of proposed developments, there has been discussion for many years about a town bypass road that would extend from the new town entrance northward and eastward where it would intersect with Kīlauea Road somewhere between the center of town and Kauapea Road. The addition of a new shopping center and the possibility of new residential development could dramatically alter the traffic profile for Kīlauea Town in the coming 10 or 15 years as the roadway network would have to accommodate much more local traffic.

A private group has advanced planning for a bicycle/pedestrian path system along the north shore of Kauaʻi. The North Shore Path alternatives analysis⁶ includes the possibility of extending and enhancing the existing 0.4 mile trail that travels alongside Kīlauea Road from Keneke Street (town shopping center) to Ilawani Lane as well as including the trail or bike lane as part of the proposed bypass road from Kūhiō Highway. The County currently has a policy that all new roads must include bike lanes, so the new road being planned as part of the new shopping center development will include a bike lane.

Kauaʻi Bus, the regional transit system, operates regular bus service on 30-minute (peak) and 1-hour (off-peak) headways from Hanalei to Līhuʻe, stopping at three transit stops in the area. The first stop is at the Anaina Hou Foundation’s community property across Kūhiō Highway near the proposed intersection with the new bypass road. There is also another Kauaʻi bus stop on the highway near the

⁴ Hunt Kīlauea Lighthouse Village Traffic Impact Analysis Report (2010)

⁵ Kīlauea Town Plan (2005)

⁶ North Shore Path Alternatives Report (Landmark Consulting, January 2012)

<http://www.kauaipath.org/content/north-shore-path-alternatives-report-now-available-review>

intersection with Kolo Road, and a third near the gym closer to the center of Kīlauea Town. Kauaʻi County operates Kauaʻi Bus and has been exploring the option of a visitor-oriented service that would traverse the North Shore from Keʻe Beach at the western edge of the state highway to Kīlauea. This service would extend bus routes into the center of Kīlauea Town and possibly all the way to the end of Kīlauea Road at the Refuge.



Figure 12: Traffic on Kīlauea Road

Transportation at Hanalei and Hulēʻia

Since Hanalei NWR and Hulēʻia NWR are closed to the general public, there is little in the way of transportation infrastructure. One significant exception, however, is the Hanalei Overlook on Kūhiō Highway. Providing visitors with a view of the extensive taro fields in the Hanalei Valley, the Overlook includes 12 parking spaces and multiple interpretive panels. The Overlook is located on a very busy stretch of Kūhiō Highway, just up the hill from a one-lane bridge over the Hanalei River. When exiting the Overlook, vehicles must back into oncoming traffic, contributing to congestion on Kūhiō Highway and resulting in unsafe conditions for pedestrians and vehicles alike. USFWS is considering alternative locations for the Hanalei Overlook.



Figure 13: Hanalei NWR Interpretive Panels



Figure 14: Hanalei Overlook Parking

Summary

The following is an overview of the major transportation-related issues and constraints identified in the Existing Conditions chapter. These findings will inform the next phases of the transportation feasibility analysis:

- The KPNWR is an attractive wildlife refuge that receives an average of 500-700 daily visitors. The Overlook alone receives at least as many visitors as those who enter the Refuge.
- Visitation to the KPNWR is highly concentrated because the Refuge's hours of operation are only six hours per day five days per week and visitors only spend an average of 40 minutes there. The recent reduction in hours from 7 days per week to 5 days per week has recently resulted in the largest average daily visitation the Refuge has ever experienced.

- While visitation to the island of Kaua‘i and to KPNWR decreased during the recent recession, it has almost come back to pre-recession levels and is expected to continue to grow in the coming years.
- Visitor information on the island about the Refuge is limited to only two official signs on Kūhiō Highway and a couple of unofficial signs along Kīlauea Road.
- All existing signage for the Refuge is for “the lighthouse” and does not mention that it is a property of the USFWS or a National Wildlife Refuge.
- Options for getting to the Refuge are quite limited because 1) there is only one public road that can be used to access it and 2) the access road within the Refuge is narrow and traverses challenging topography.
- Visitors to the Refuge come there almost exclusively by private automobile; other modes cannot be safely accommodated.
- The Refuge does not have room within its land holdings to significantly expand parking inside of the existing gate to the Refuge.
- While the businesses within the town of Kīlauea are positively affected by the visitation to the Refuge, the traffic it creates on Kīlauea Road is seen as a detriment to the quality of life and safety in the town.
- The Town of Kīlauea has experienced slow growth over the years but there are several developments in process that are likely to increase local visitation to the town center, and that may spur some additional residents and roads.

This feasibility study will explore the preferred options for improving visitor safety and transportation to and within the Refuge identified in the KNWRC CCP. The CCP looked at several options that expand the possibilities for the transportation experience of visitors to KPNWR. The preferred option was determined after an extensive analysis and a public process; this study recommends the most promising methods for implementing it.

Planned Improvements for the Refuge

KNWRC was awarded two Public Lands Highway Discretionary Grants to conduct transportation improvements inside of the Refuge. The first was used to provide pedestrian safety improvements along the pedestrian pathway to the lighthouse and the second is to correct vehicle circulation problems between the access road, the upper parking area, and the lower parking area. While these problems have been identified as important for the Refuge to address, the parking area design issue poses engineering challenges because of the topography. At the time of writing this report, the design for the project has not been developed, but the Refuge expects to relocate the fee booth further up the pedestrian path in order to provide room for the circulation to be fixed.

Chapter 3: Regional Context



Background

Kīlauea Point National Wildlife Refuge (KPNWR or Refuge) CCP attempts to find a long term solution for resolving the congestion at the Refuge. To help with the decision process Volpe completed baseline conditions for the Refuge and surrounding area (Chapter2). In addition, CFLHD conducted a baseline transportation study of the entire Island of Kauaʻi. This chapter summarizes this regional analysis.

In the past the CFLHD Planning Team has done these kinds of studies by offering several pieces of background data - Demographics, Transportation, Land use – and constructing them to create an overall snapshot of regional conditions. In addition to offering some of these pieces of background data, CFLHD also recently developed a GIS tool for recreation-based transportation studies called the Transportation Recreational Opportunity Spectrum (TROS). It attempts to normalize recreation conditions in various sites by scoring several attributes key to recreation transportation. In using some of the methods created by developing TROS, CFLHD will offer a unique approach to showing the baseline recreation travel on the Island of Kauaʻi and offer some solutions that would not require large amounts capital from partner agencies.

Population and Demographics

Countywide Population Trends & Projections

Figure 15 shows that the population of Kauaʻi has been steadily growing over the past 40 years and projections predict this trend to continue at least through 2035.⁷ With a projected annual growth rate of 1.0%, Kauaʻi is expected to grow in population from 67,000 in 2010 to around 85,000 residents by 2035. Figure 15 also shows the “de facto” population, which is the average daily number of people in Kauaʻi at any given time, including visitors and excluding residents temporarily absent. Given that Kauaʻi is such a popular tourist destination the de facto population is a more accurate representation of the population present. The de facto population is expected to grow from 81,242 in 2010 to 98,979 in 2035.⁸

⁷ Hawaiʻi Department of Business, Economic Development & Tourism (DBEDT). Population and Economic Projections

⁸ Hawaiʻi DOT projections, 2008. Calibrated using new 2010 U.S. Census households’ figures by TAZ. Kauaʻi 2012 Transportation Data Book, May, 2012.

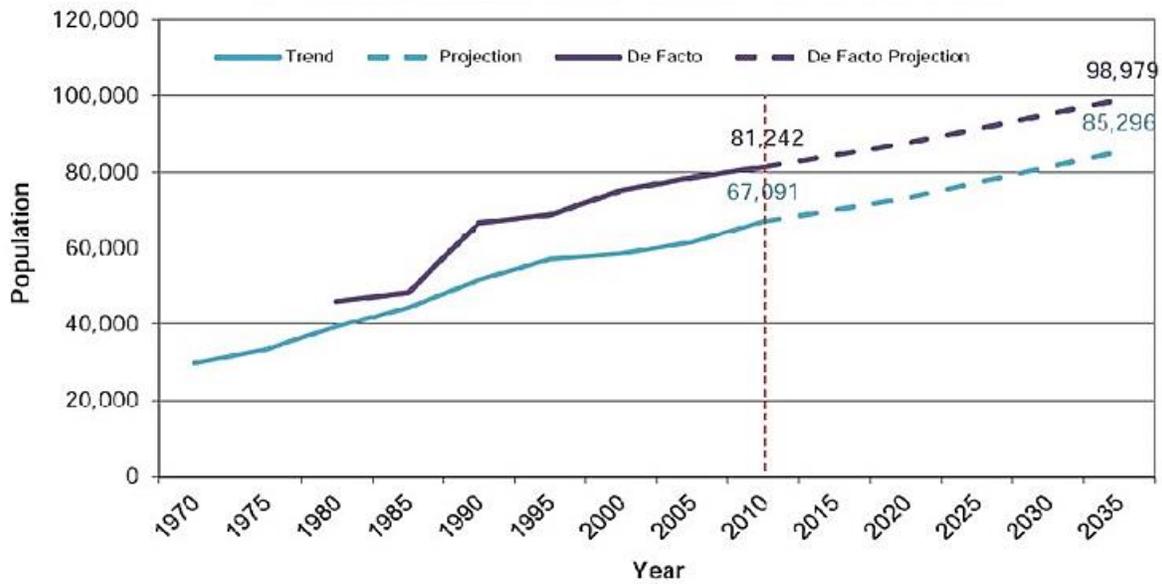


Figure 15: Kaua'i County Population Trends

Population Distribution by Area

Table 1 shows the population distribution by area of Kaua'i, with both 2010 figures and 2035 projections. Figure 16 shows the population by area in a map.⁹

Table 1: Kaua'i Population Distribution by Island Area

Kaua'i Districts	2010	2035	% Growth
West Side	11,722	13,619	16%
Koloa-Po'ipū-Kalaheo	11,696	16,150	38%
Līhu'e	14,683	22,223	51%
East Side	20,813	24,626	18%
North Shore	8,007	8,678	8%
Total	66,921	85,296	27%

⁹ 2010 population collected from the U.S. Census Bureau. Hawai'i DOT projections, 2008. Calibrated using new 2010 U.S. Census households' figures by TAZ.

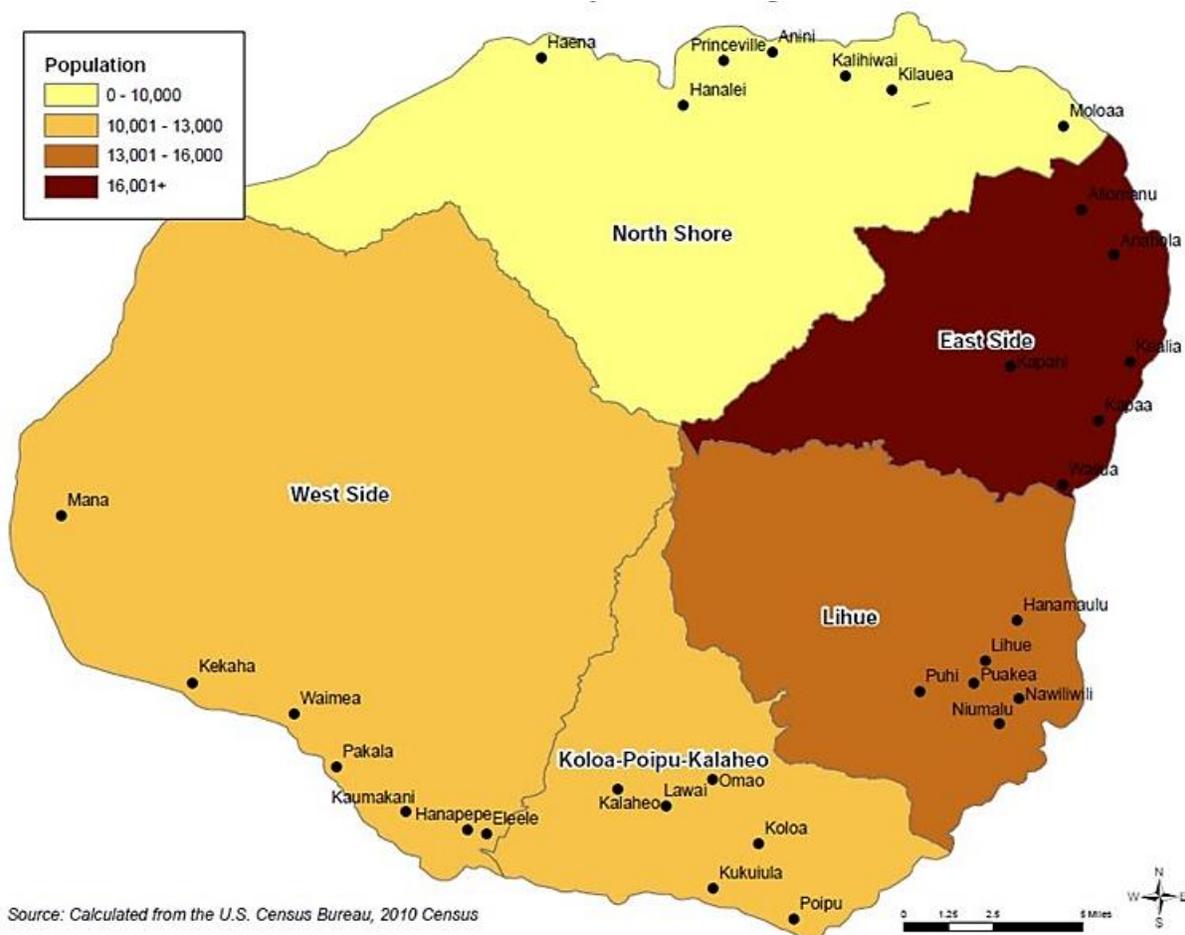


Figure 16: Kaua'i 2010 Population by District

Land Use Information

Figure 17 shows basic land use. The island is dominated by an extinct volcano in its center, Mount Wai'ale'ale, creating a series of steep mountains and deep valleys, inaccessible to motorized transportation. Because of this, the bulk of the island is undeveloped forest land. Population centers show as urban. Alternatively, Figure 18 shows Recreation-based settings based on TROS. This land use study is very similar to the US Forest Service's Recreation Opportunity Spectrum, showing areas of general recreation opportunities ranging from urban (city parks) to primitive (bush-whacking). Note that what is simply urban in Figure 17 is split between urban and suburban in Figure 18. Please see Appendix A for a full explanation of TROS Settings.

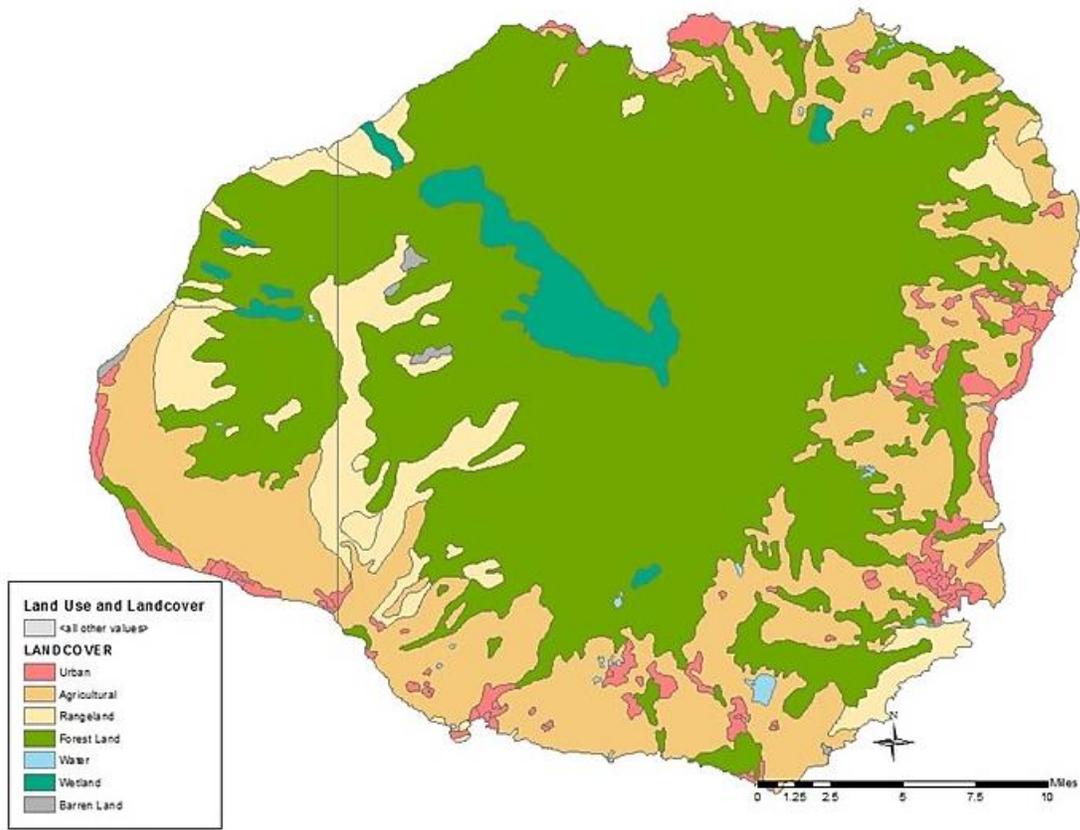


Figure 17: Kaua'i Land Use and Landcover (Source: 1976 Digital GIRAS Files, State of Hawai'i)

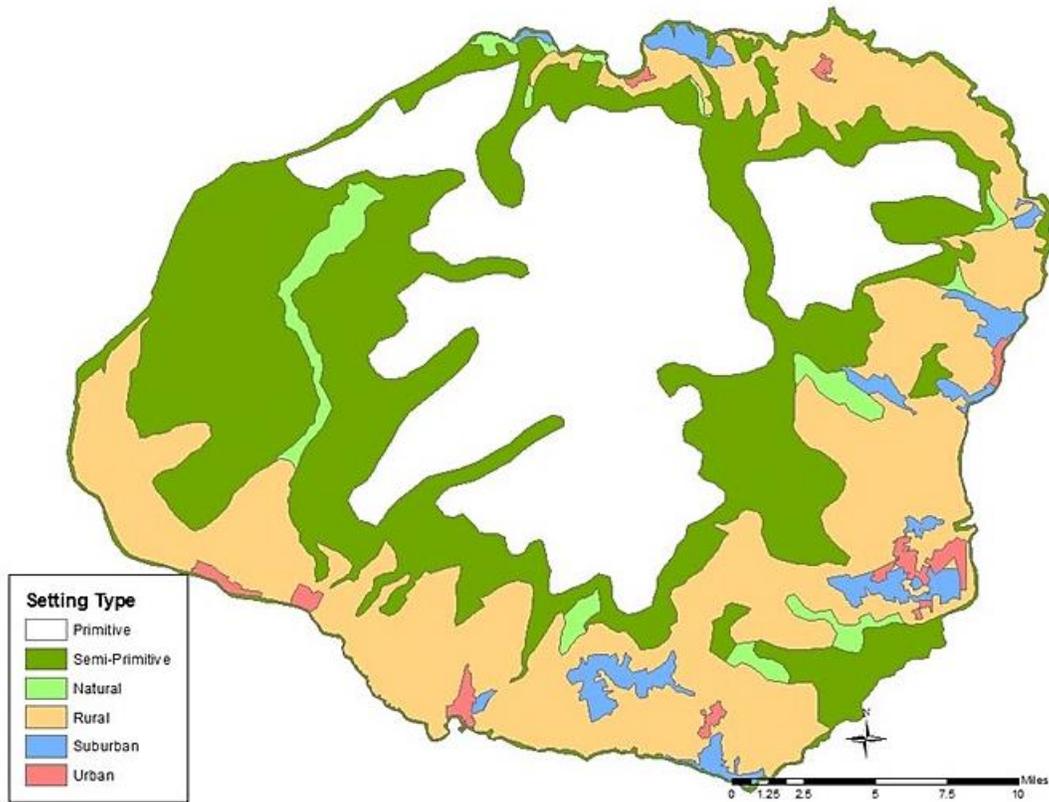


Figure 18: Kaua'i Recreation-Based Settings (Source: FHWA, CFLHD, 2014)

Transportation Infrastructure

Kaua'i Road Network

The road network of Kaua'i consists of a main semi-circular route consisting of State Routes 50, 550, 56, and 560 which links most of the major population centers of the island (with the exception of Koloa-Po'ipū). Other state routes branch off of this main route to access other areas of the island. The fact that no route completely circumnavigates the island (as the islands of O'ahu and Hawai'i do), offers unique transportation challenges, the most important of those being that all traffic on the island must circulate via the East Side district of Kapa'a and Wailua. Figure 19 shows the general road network, while Figure 20 shows Annual Average Daily Traffic for sections of the main highways.

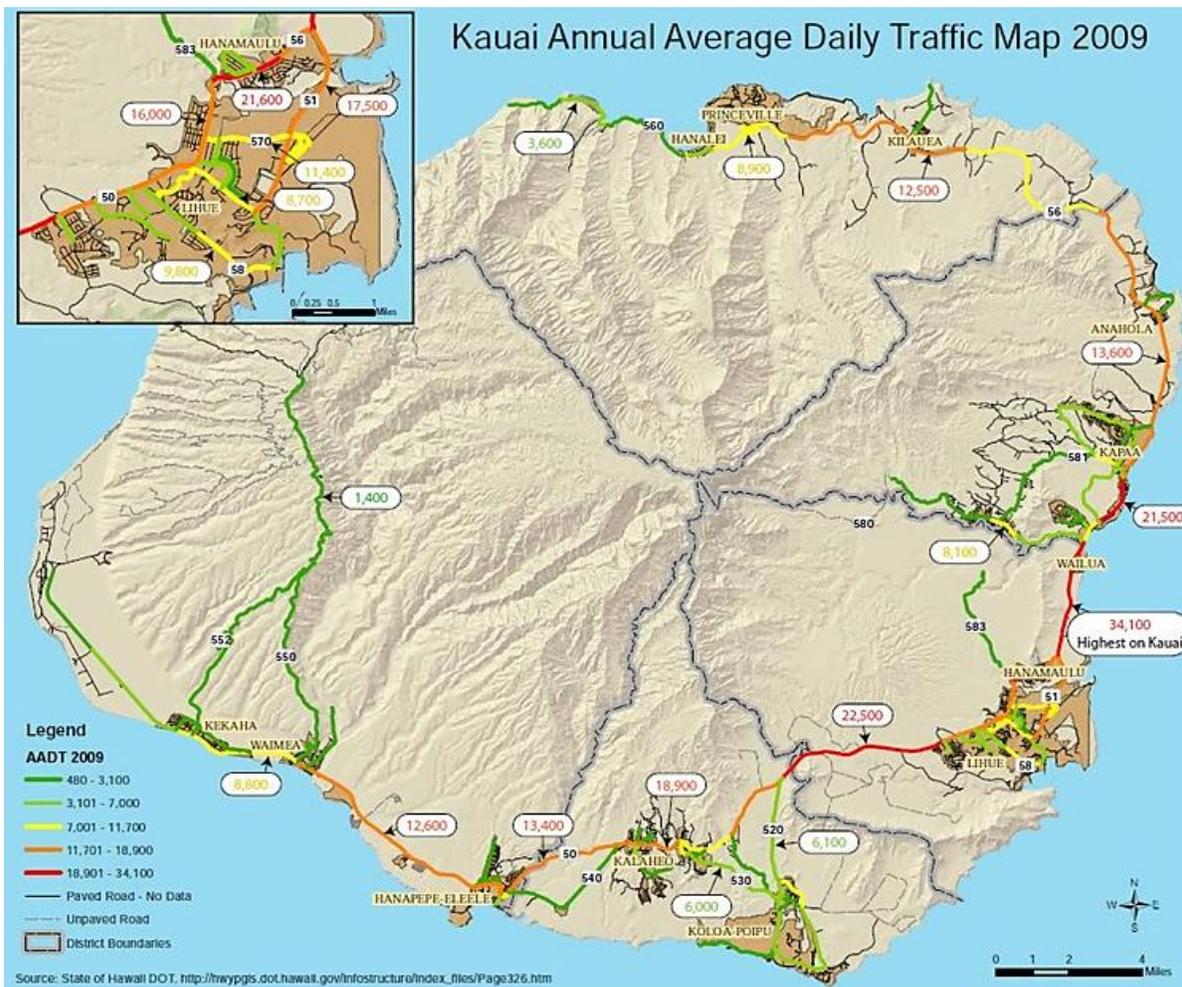


Figure 20: Kaua'i Annual Average Daily Traffic Map 2009

Air Travel to Island of Kaua'i

Air travel is the primary way for visitors to travel to the island. According to the Hawai'i Department of Tourism, on average 3,020 visitors travel to the island by air each day.¹⁰ The primary airport on Kaua'i is Lihue Airport, located in Lihue. The Lihue Airport handles domestic flights to and from both Hawai'i and the mainland, and handles over 400 flights of all kinds each day (including general aviation).¹¹

Transit on Island of Kaua'i

The majority of public transit on the island of Kaua'i is handled by the Kaua'i Bus, operated by the County of Kaua'i. Kaua'i Bus operates four mainline routes and four shuttles, reaching most of the island. Headways are typically every hour, except at commute hours, where they operate at 30 minutes. Each mainline route centers in Lihue and branches off to the north and west. Bus stops are a mix of dedicated marked roadside stops and off-street stops at particular locations, such as the Mall and Hospital. Figure 21 shows each route, while Figure 22 shows an example of one of the schedules, from Hanalei to Lihue.

¹⁰ Hawai'i Department of Business, Economic Development, and Tourism, Visitor Air Statistics, 2014.

¹¹ Airport IQ5010, Airport Master Records and Reports, 2012.

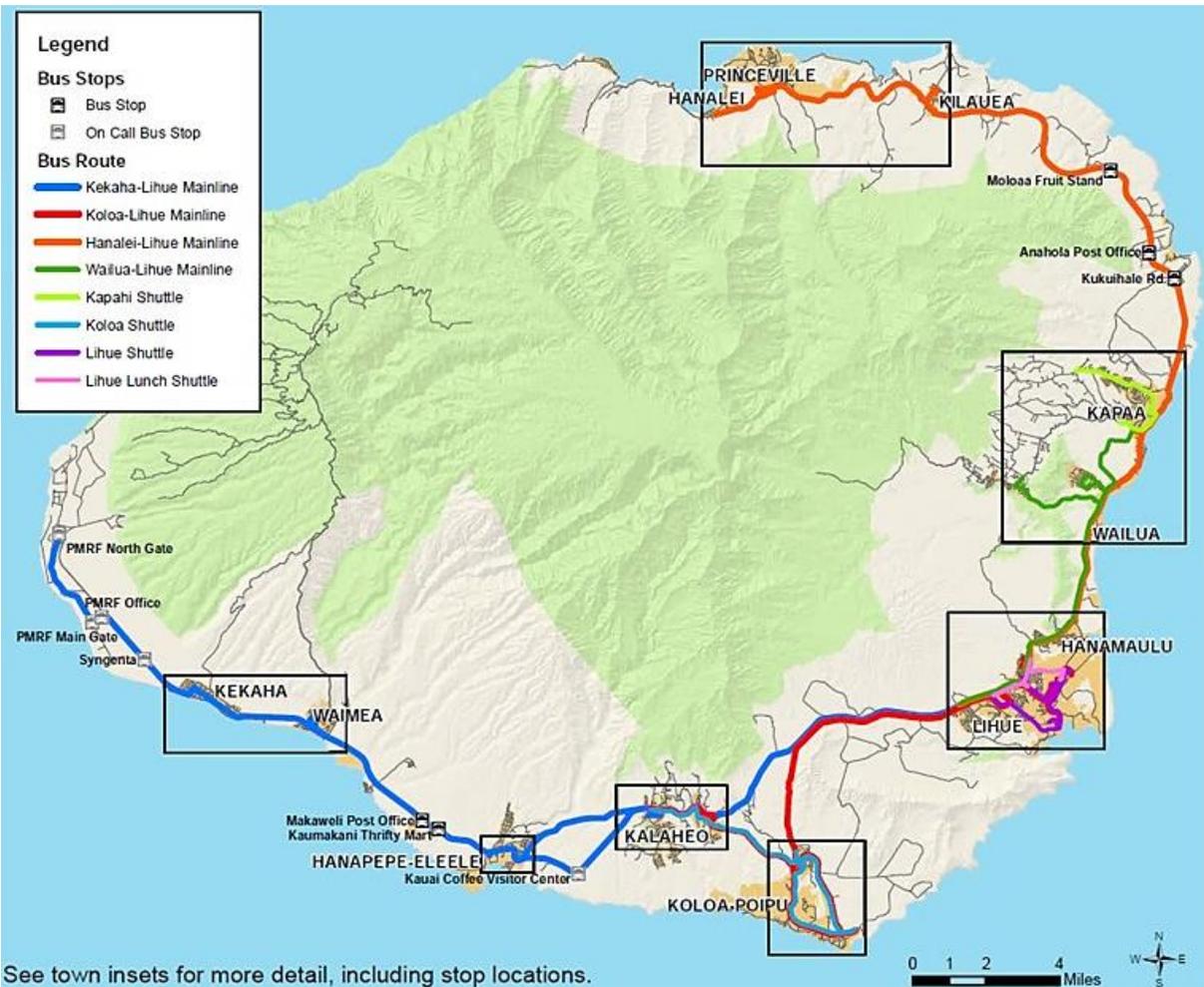


Figure 21: Kauai Bus Routes

HANALEI - LIHUE MAINLINE	M-F	M-F	M-F	M-F	M-F	M-F	M-F	M-F	M-F	M-F	M-F	M-F	M-F	M-F	M-F	M-F	M-F	M-F	M-F
	450	400	450E	SS/Hol 400	400														
OLD HANALEI COURTHOUSE	6:15			7:15	7:45	8:15	9:15	10:15	11:15	12:15	1:15	2:15	3:15	4:15	5:15	5:45	6:15	7:15	8:15
HANALEI CENTER	6:16			7:16	7:46	8:16	9:16	10:16	11:16	12:16	1:16	2:16	3:16	4:16	5:16	5:46	6:16	7:16	8:16
HARAGUCHI FARM	O/C			O/C	O/C														
A/C PRINCEVILLE LIBRARY	6:22			7:22	7:52	8:22	9:22	10:22	11:22	12:22	1:22	2:22	3:22	4:22	5:22	5:52	6:22	7:22	8:22
ANAINA HOU (O/C)	O/C			O/C	O/C														
KILAUEA GYM	6:31			7:31	8:01	8:31	9:31	10:31	11:31	12:31	1:31	2:31	3:31	4:31	5:31	6:01	6:31	7:31	8:31
A/C KILAUEA FOOD MART	6:34			7:34	8:04	8:34	9:34	10:34	11:34	12:34	1:34	2:34	3:34	4:34	5:34	6:04	6:34	7:34	8:34
MOLOOA FRUIT STAND	6:39			7:39	8:09	8:39	9:39	10:39	11:39	12:39	1:39	2:39	3:39	4:39	5:39	6:09	6:39	7:39	8:39
A/C ANAHOLA POST OFFICE	6:46			7:46	8:16	8:46	9:46	10:46	11:46	12:46	1:46	2:46	3:46	4:46	5:46	6:16	6:46	7:46	8:46
A/C KUKUHAILE RD	6:48			7:48	8:18	8:48	9:48	10:48	11:48	12:48	1:48	2:48	3:48	4:48	5:48	6:18	6:48	7:48	8:48
A/C KEALIA BEACH	6:52			7:52	8:22	8:52	9:52	10:52	11:52	12:52	1:52	2:52	3:52	4:52	5:52	6:22	6:52	7:52	8:52
FRIENDSHIP HOUSE	O/C			O/C	O/C														
KOJIMA STORE	5:58			7:58	8:28	8:58	9:58	10:58	11:58	12:58	1:58	2:58	3:58	4:58	5:58	6:28	6:58	7:58	8:58
KAPAA SKATE PARK	6:00	**7:00	7:00	8:00	8:30	9:00	10:00	11:00	12:00	1:00	2:00	3:00	4:00	5:00	6:00	6:30	7:00	8:00	9:00
A/C PONO KAI	O/C			O/C	O/C														
KAPAA BIG SAVE	6:04	7:04		8:04	8:34	9:04	10:04	11:04	12:04	1:04	2:04	3:04	4:04	5:04	6:04	6:34	7:04	8:04	9:04
KUHIO HWY/HOI RD	6:07	7:07		8:07	8:37	9:07	10:07	11:07	12:07	1:07	2:07	3:07	4:07	5:07	6:07	6:37	7:07	8:07	9:07
WAILUA BRICK OVEN PIZZA	6:10	7:10		8:10	8:40	9:10	10:10	11:10	12:10	1:10	2:10	3:10	4:10	5:10	6:10	6:40	7:10	8:10	9:10
KALEPA VILLAGE	6:19	7:19		8:19	8:49	9:19	10:19	11:19	12:19	1:19	2:19	3:19	4:19	5:19	6:19	6:49	7:19	8:19	9:19
LAUKONA RD	6:20	7:20		8:20	8:50	9:20	10:20	11:20	12:20	1:20	2:20	3:20	4:20	5:20	6:20	6:50	7:20	8:20	9:20
SUN VILLAGE (O/C)***	Drop Only	Drop Only		Drop Only	Drop Only	Drop Only	O/C												
WILCOX HOSPITAL FOYER***	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only
LIHUE CIVIC CENTER***	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only
KUKUI GROVE - FIRST HWY BANK***	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only
KCC PERFORMING ARTS CENTER***	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only	Drop Only

**Transfers available to route 450E for direct route to Lihue
 ***Pick ups on Saturdays, Sundays & Holidays

Figure 22: Exampe Kauai Bus Schedule

Kaua'i Bus ridership has gone up across the board from 2007 to 2011, and average 2,445 riders per day in 2011. This is, however, but a fraction of all mode trips on the island, as it is calculated that 93.1% of all mode trips were by car in 2011, compared to just 0.4% by transit.¹² Table 2 and Figure 23 show ridership by route for 2007 to 2011.

Table 2: Kaua'i Bus Ridership by Route

Route	Sep 2007	Sep 2011	% Increase
Kekaha Mainline	397	755	90%
Hanalei/Kapa'a Mainline	402	1,036	158%
Koloa Mainline	17	70	307%
Wailua Mainline	17	33	89%
Koloa Shuttle	14	33	141%
Kapahi Shuttle	83	215	159%
Lihu'e Shuttle	111	247	123%
Lihu'e Lunch Shuttle	33	56	81%

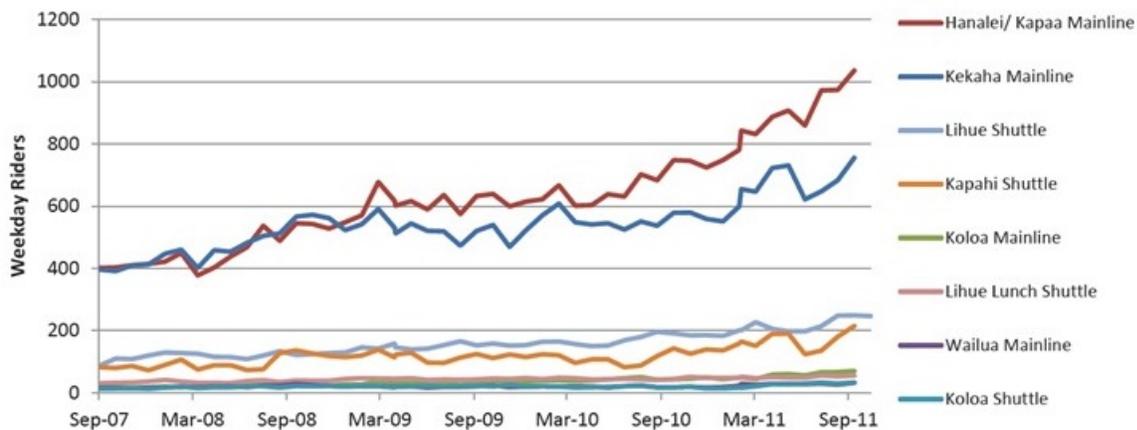


Figure 23: Kaua'i Bus Ridership by Route (Source: Kaua'i County)

Bicycle and Pedestrian

Bicycle and pedestrian trips account for 6.5% of all mode trips in Kaua'i in 2011.¹⁰ There are several multi-use paths on Kaua'i, the most prominent being the Ke Ala Hele Makalae, which when complete will offer a multi-use off-street path from Lihu'e to Anahola on the east side of the island. There are currently no designated non-motorized paths on the North Shore, but there are plans to build one that would link Kilauea Town to Hanalei. Figure 24 shows existing and proposed bicycle trail on the island.

¹² Kaua'i 2012 Transportation Data Book.

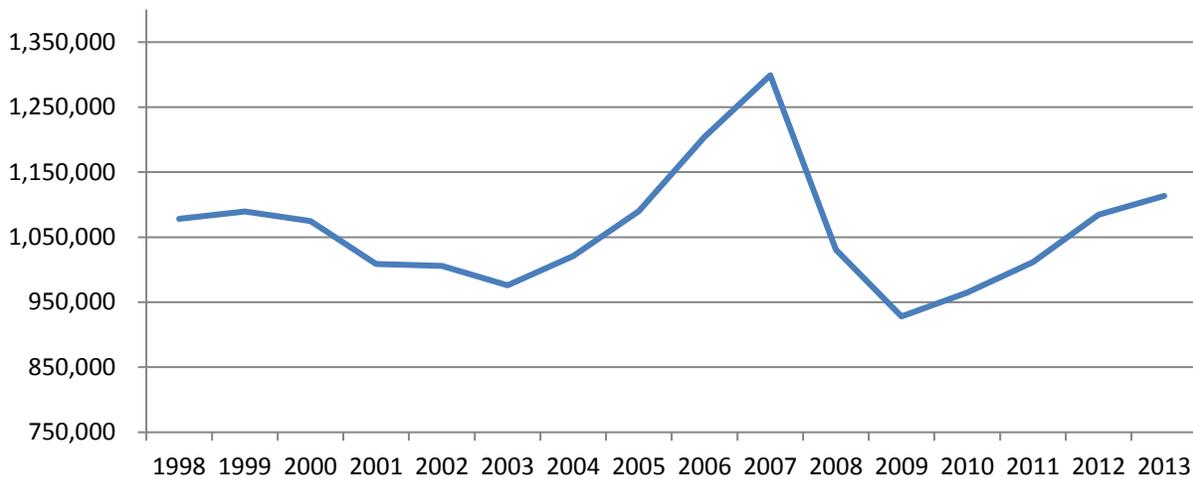


Figure 25: Kaua'i Visitation: 1998-2013

Cruise Arrivals and Tour Companies

Cruise visitation averages 683 per day, or nearly 4800 per week.¹⁴ This accounts for 18% of all visitors to the island. The majority of cruise visitors use private tour companies to visit the island. These tour companies travel to all the major destination sites.

Rental Car Data

Because so much of transportation on Kaua'i is auto-based, rental cars are an important component of the visitor experience on the island. As of 2012 there are 14 rental car companies on the island. Rental car data is difficult to find, but some data can be extracted from the Census Bureau. Table 3 shows the number of establishments, revenue, and estimated fleet size for the years 2002 and 2007. Because visitation has decreased since 2007, it is expected that current fleet size has also decreased on the island.¹⁵

Table 3: Rental Car Establishments, Revenue, and Fleet Size on Kaua'i Island: 2002 and 2007

Year	2002	2007
Establishments	10	11
Revenue	\$61,100,000	\$82,207,000
Est. Fleet Size	6,100	7,100

¹⁴ Hawai'i Department of Business, Economic Development, and Tourism,, Visitor Statistics 2014.

¹⁵ Kaua'i 2012 Transportation Data Book.

Top Destination Sites

Nearly all visitors to Kaua'i will visit at least a few of these 20 top destination sites, as displayed in Figure 26. These top destination sites were highlighted on several Kaua'i tourism websites and represent the most popular tourist destinations:

- Kalalau Trailhead / Kē'ē Beach
- Maninihola / Hā'ena Beach
- Hanalei Town
- Hanalei Beach
- Hanalei Overlook
- Kīlauea Point NWR
- Kapa'a Town
- Opaeka'a Falls
- Wailua Marina (for Wailua River tours)
- Wailua Falls
- Nāwiliwili Town and Beach
- Kilohana Plantation
- Po'ipū Beach
- Spouting Horn
- Hanapēpē Town
- Port Allen (for Nāpali Coast tours)
- Waimea Town
- Waimea Canyon
- Pu'u Hinahina (Waimea Canyon)
- Kalalau Overlook

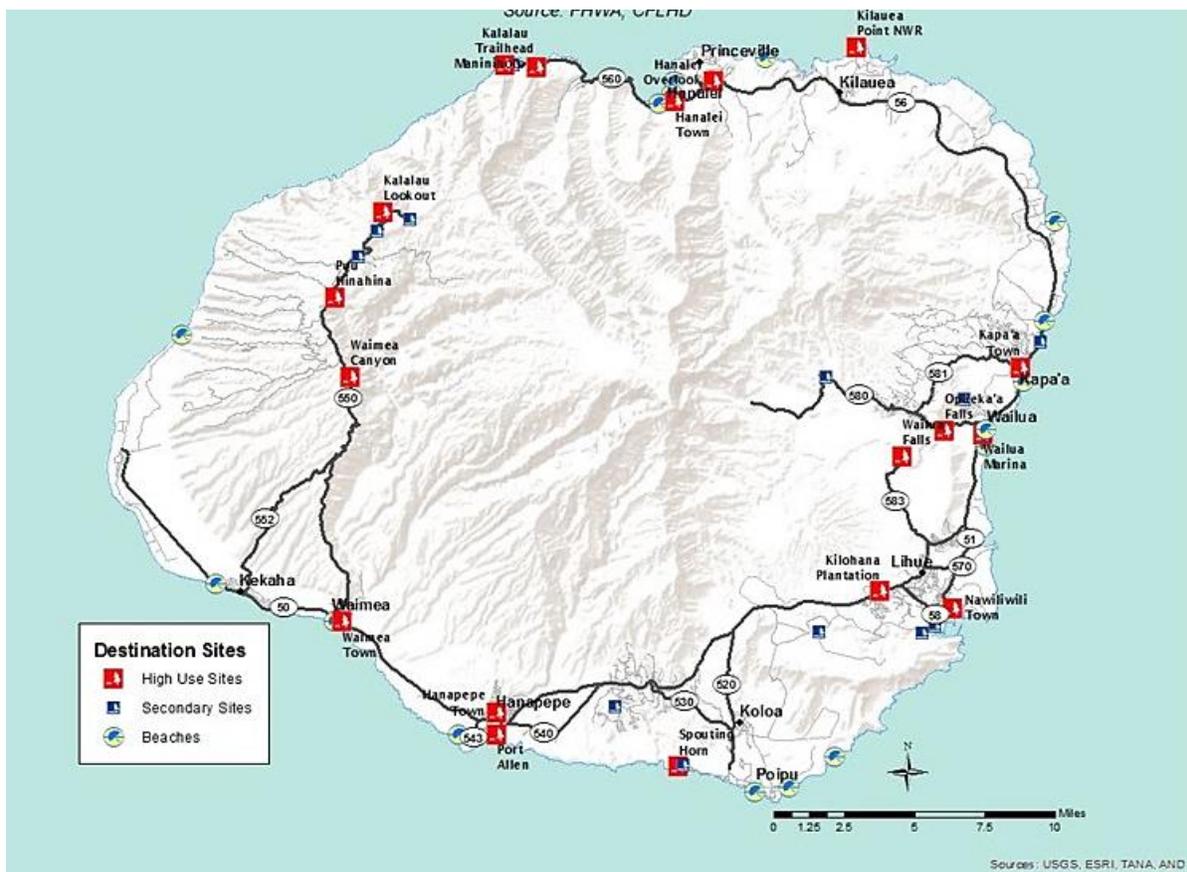


Figure 26: Kaua'i Destination Sites (Source: FHWA, CFLHD)

Hotel Zones on Kaua'i

Hotels and vacation units tend to be concentrated in distinct locations on the island. Figure 27 shows the concentrations of nearly every hotel and Individual Vacation Unit (IVU). As indicated in Table 4, the majority of visitors stay in the Po'ipū area, followed by Wailua / Kapa'a, Hanalei / Princeville, Līhu'e, and Waimea / Kalaheo.¹⁶

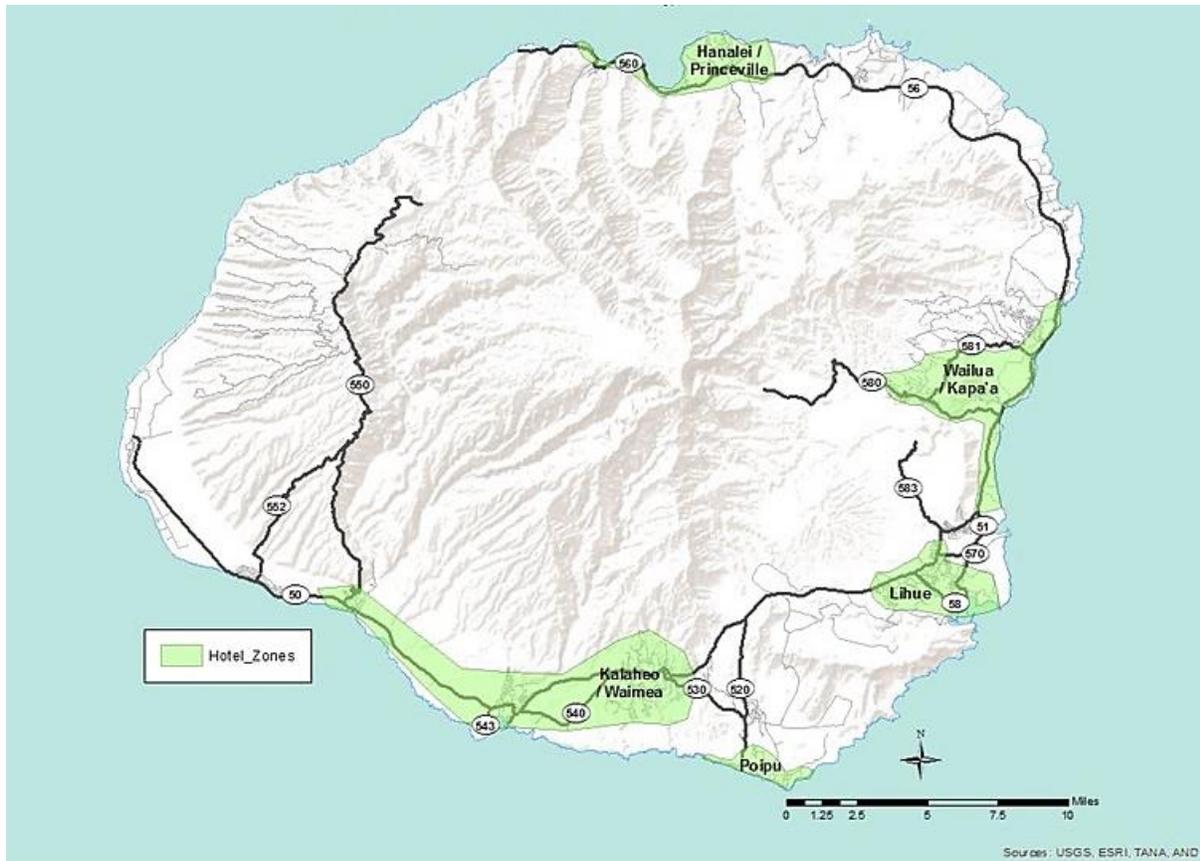


Figure 27: Kaua'i Hotel Zones

Table 4: Hotel Rooms by Zone

Hotel Zone	Total Rooms	Multi-Unit Rooms
Kalaheo / Waimea	173	154
Po'ipū	2972	2869
Līhu'e	1205	1201
Wailua / Kapa'a	1907	1869
Hanalei / Princeville	1649	1452

¹⁶ Hawai'i Department of Business, Economic Development, and Tourism, Visitor Plant Inventory 2012

Road-Based Visitor Travel Distances

93% of all mode trips in Kaua'i are by vehicle. In addition, 91% of all trips in 2011 were non-commute trips.¹⁷ Figure 28 shows the destination sites and their average distances from the hotel zones. Because visitors are concentrated into distinct areas, it was possible to derive an average distance for the entire visitor population to each site by multiplying the population (i.e., rooms available) of the hotel zones by its distance to a particular site. If, for example, Kīlauea Point is 18 miles from the Kapa'a hotel zone, then Kīlauea Point is 18 miles from 1,907 hotel rooms. The distances to each hotel zone are then averaged to come up with an average distance from the visitor population. Values can be adjusted based on occupancy rates, occupants per unit, and visitors per vehicle. This study shows that some of the most popular destination sites are relatively remote, meaning more vehicle miles travelled to those sites. Please see Appendix B for a detailed explanation of the average distance model.

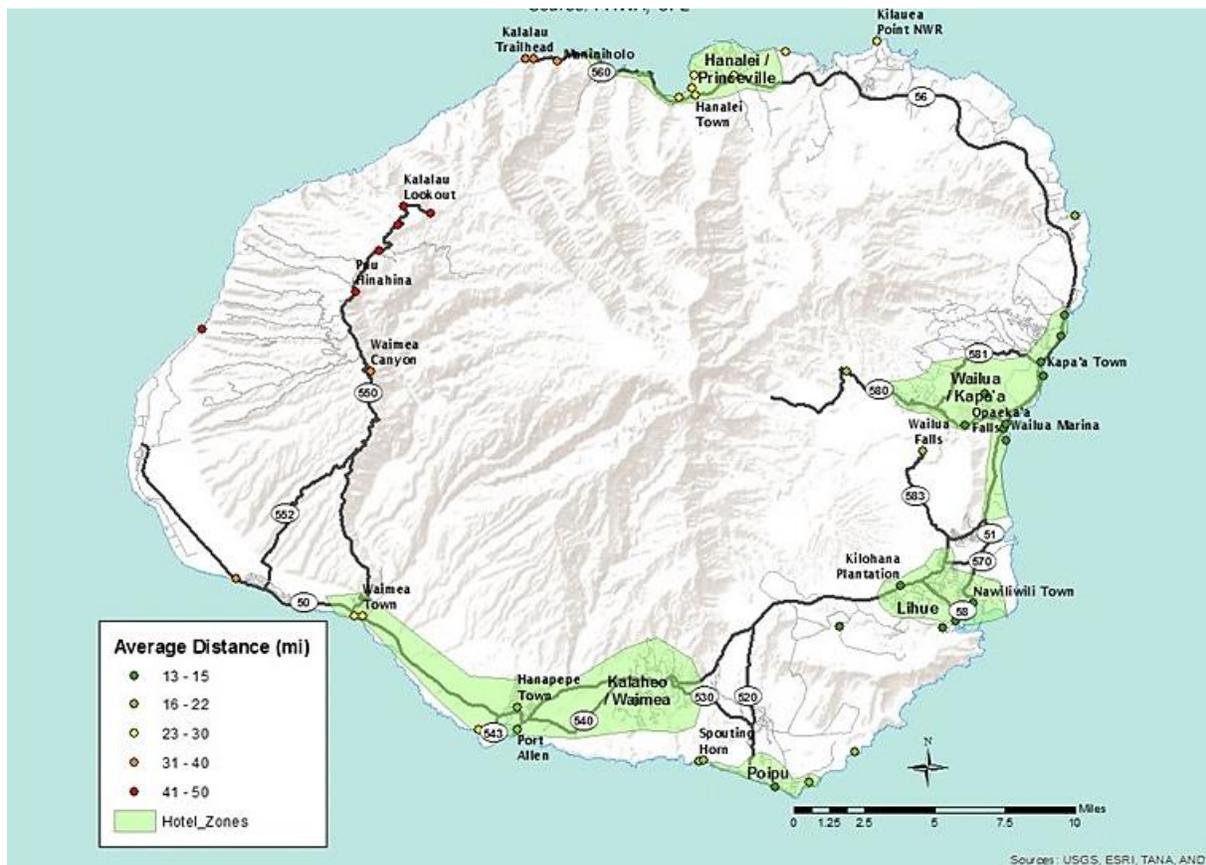


Figure 28: Kaua'i Average Distance Between Hotels and Destination Sites (Source: FHWA, CFLHD)

Destination Site Parking Capacity

At the far ends of the main island road lie the farthest destination sites, all over 30 miles away by car from the majority of the visitor population. Because of the natural beauty surrounding these sites, they see quite a bit of visitation on a daily basis. Table 5 shows three such sites, with their approximate parking capacities (i.e., number of parking places available), and the peak hour traffic on the route directly leading to each site. Peak hour traffic exceeds the parking capacity of each site, leading to

¹⁷ Kaua'i 2012 Transportation Data Book.

parking overflow and overcrowding of the site. Because these traffic sections are past the point of most residences, it is assumed that the great majority of the traffic is recreational based.

Table 5: Kaua'i Destination Sites' Parking Capacities

Site	Parking Capacity	Peak Hour Traffic
Kalalau Trailhead / Kē'ē Beach	~50	78
Kīlauea Point	~60	122
Kalalau Overlook	40	117

Kaua'i Bus and Destination Sites

The Kaua'i Bus is primarily dedicated to commuter travel, so most of its bus stops are designed to meet commuter demands. Because of this few bus stops come within comfortable walking distances of destination sites. Figure 29 shows the bus stops along the Hanalei – Līhu'e route, in both directions, and the number of destination sites within walking distance of those stops. Only nine destination sites are within a half mile of a bus stop, and of those, only six are within a quarter mile. Top destination sites such as Kalalau Trailhead, Kīlauea Point, Opaeka'a Falls, and Wailua Falls are more than 1 mile away from any Kaua'i Bus stop. In the case of Opaeka'a Falls, a bus route goes past this site, but does not stop there. There is currently no bus access to Waimea Canyon or Kalalau Overlook.

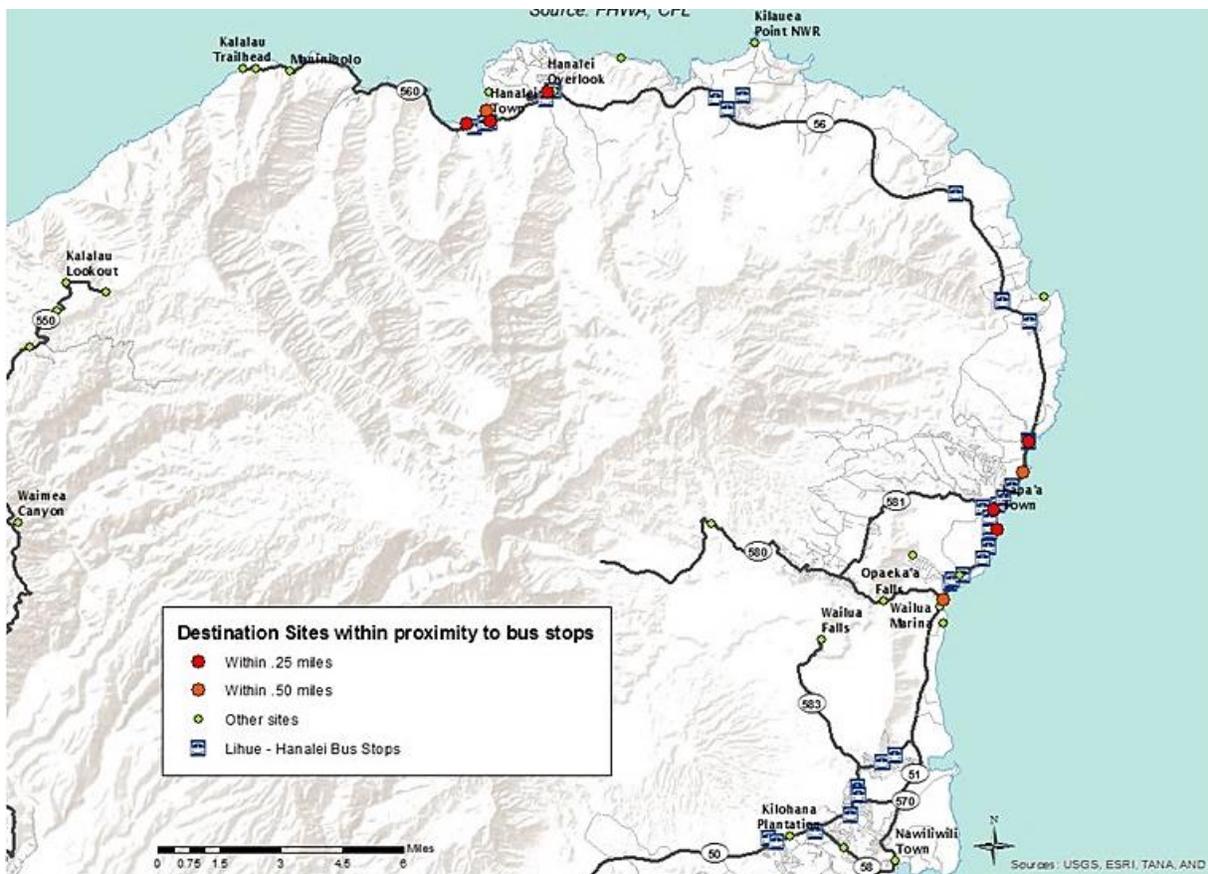


Figure 29: Hanalei- Līhu'e Route: Destination Site's Proximity to Bus Stops (Source, FHWA, CFLHD)

Transportation Opportunities

Given the transportation background data and the study of destination sites, it becomes clear that there are specific transportation opportunities that could get visitors out of their cars and into other modes of recreation travel.

Transit

The Kaua'i Bus is an increasingly popular mode of travel for commuters and those who live on the island, but there are opportunities to increase ridership among visitors. One of the mid-term priorities for Kaua'i Bus, according to Kaua'i's 2012 Multimodal Land Transportation Plan (MLTP) is to initiate new local circulators. One such circulator specifically mentioned is North Shore. This Regional Study suggests that there could be one such circulator operating out of Hanalei or Kīlauea Town, with emphasis on providing access to **visitor destinations**. A circulator such as this would help get visitors out of their cars, alleviate traffic congestion island-wide, relieve capacity issues at the North Shore destination sites, and increase ridership for Kaua'i Bus. Visitors could take the mainline Līhu'e-Hanalei bus, and then switch to a circulator that could take them to Kē'ē Beach, Maninihola, or Kīlauea Point. In order for this to be effective, headways would have to be reduced to 30 minutes for peak mid-day recreation travel. A similar circulator could be used at Waimea to take visitors to Waimea Canyon and Kalalau Overlook. Since the bulk of recreation travel takes place during the day and on weekends, these same circulators could be re-routed to commuter demand during peak commute times.

Non-Motorized Trails

An increase in non-motorized trails would have a great impact on recreational travel in some of the more remote areas of the island. A North Shore trail has been proposed, and a trail link between it and Ke Ala Hele Makalae on the east side of the island would link Hanalei and Līhu'e by trail. Widening shoulders on Highways 550 and 560 would allow visitors to ride their bicycles more safely in those corridors, where separate trails may not be as feasible.

Visitor Information and Messaging

Increasing awareness of the capacities of particular destinations such as Kīlauea Point at key locations closer to those visitor populations will help alleviate some of the congestion problems. For example, a permanent messaging sign (either dynamic messaging or radio station) on Route 56 at Kapa'a or Anahola with parking capacity information would help let visitors know when the best times to visit North Shore destinations.

Partner Collaboration

For any of these strategies to work it is important that all shareholders work in collaboration. The U.S. Fish & Wildlife Service, State of Hawai'i, Kaua'i County, and the Kaua'i Tourism Board each have a large stake in the recreational opportunities present on the island of Kaua'i. In order to continue to make the visitor experience on Kaua'i the very best in the country, all of these agencies must work hand in hand to ensure recreational transportation on Kaua'i can overcome the island's unique challenges.

Chapter References

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3. Hawai'i Historical Visitor Statistics
<http://dbedt.Hawaii.gov/visitor/>

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1. 2009 Traffic Data for Kaua'i
http://hwypgis.dot.Hawaii.gov/infostructure/index_files/Page326.htm

Chapter 4: Access Management Tools



Introduction

The purpose of this chapter is to lay out recommended access management strategies that could be deployed by the Kīlauea Point National Wildlife Refuge (KPNWR or Refuge) to mitigate chronic parking congestion both inside and outside the Refuge gate on Kīlauea Road. The chapter focuses on strategies to alleviate congestion on the Point parking area, as well as considering implications for the Overlook parking area.

The specific access management strategies that will be considered in this chapter are:

- **Entrance Fee:** Increasing the current entrance fee to fund non-transportation and transportation solutions to enhance visitor services and mitigate vehicular congestion.
- **Reservation or Timed Entry System:** A reservation or timed entry system requires some or all visitors to reserve their parking space and access to a site in advance of arriving there. A timed entry system can be used to manage visitation to current parking capacity and/or provide advance notice on visitor demand. Knowing visitor demand ahead of time can inform the amount of transit service or staffing that would be needed throughout the year.
- **Intelligent Transportation System (ITS) and Visitor Information Tools:** ITS and visitor information tools describe a hosts of technologies and tools the Refuge could use to collect information (such as how many parking spots may be available at the Point), manage access onto the point, and/or present information to travelers through variable/dynamic message signs or other visitor notification methods. These tools can help the Refuge staff monitor visitation and traffic patterns on site, and also provide information to visitors in an attempt to influence when and how they visit the Refuge.
- **Parking Lot Management and Reconfiguration:** Long-term plans for the Overlook and Point parking lots will likely include reconfiguration to facilitate moving the mandatory shuttles in and out of the site. This work may take a few more years to complete. In the short-term temporary parking lot management tools and small improvements may be necessary to manage current parking issues at the Overlook.

The recommendations consider tools that are useful regardless of the presence of transit or not. Should the Refuge choose to pursue one of these access management strategies there are points of decision they will need to work through. So, within the recommendations are also considerations for implementation of that strategy or tool at the Refuge.

The chapter then outlines a set of steps or actions the Refuge should take to pursue implementation of these access management tools. Recommendations and action steps are laid out in the short (0-3 years) and medium-long term (3+ years) timeframe.

Recommendations and Considerations

There are a variety of unique challenges facing the Refuge related to managing visitor access. First and foremost is the lack of physical space to consider any expansion of existing parking or the accommodation of large transit vehicles. The Refuge has decided to work toward solutions that will reduce or eliminate personal/private owned vehicles (POVs) beyond the entrance gate, and require that visitors take a bus or tram from a nearby location. The recommendations and considerations in this section focus on this goal.

Adequate accommodations to allow safe access for visitors who would arrive on foot or by bike are also a challenge. The County, Refuge, and FHWA-Central Federal Lands Highway Division (FHWA-CFLHD) are

working on a feasibility study and design of a bicycle and pedestrian facility connecting downtown Kīlauea to the Overlook. The outcomes of this work will help determine if and how future access for bicycles and pedestrians to the Overlook and Point are allowed. As part of this project, reconfiguration of the Overlook design will also be considered. The project is being funded via the Federal Lands Access Program and the Federal Lands Transportation Program (FLTP).

Entrance Fee (0-3 years)

In order to accomplish the Refuge's goal of eliminating POVs at the Point and moving toward the implementation of a mandatory transit system, it is going to require an increase in the entrance fee that ranges from \$3 to \$9 more than the existing \$5 per visitor charge. Before going into the rules prohibiting fees being broken into non-transportation and transportation components, it's important to recognize how the fee increase would be apportioned. The Refuge needs to raise the current fee by a minimum of \$3 for non-transportation related visitor services and a minimum \$2 for transportation related visitors services, depending on what configuration of transit service is pursued. Increased revenue could also be used for a timed entry system that could be deployed with or in lieu of transit. Section B of this chapter discusses this tool and states an additional study, to determine cost of a timed entry system and entrance fee increases under that system, would be needed.

When considering any transportation fee increase, it is important to first run through the rules governing these increases¹⁸:

1. Regional Directors (RD) may approve smaller modifications (fee changes of \$10 or less or up to 20% of the current fee - if it is less than a \$10 increase then this applies, not the greater of the two) and additional fee activities, if they are not controversial. For example, the Regional Director may approve a fee for a non-game hunt at a Recreation Fee site that already has a fee for other hunts. However, a Recreation Fee site that wants to establish a first-time entrance fee will likely need to publish in the Federal Register. Even small modifications require public involvement and if the modification is controversial, the Refuge should seek the Director's approval or publish in FR. It can take up to 3 months to get Regional Director approval.
2. Significantly modifying an existing fee activity (fee changes of more than \$10 or more than 20%), or adding controversial fee activities or to an approved site's fee program require Director's approval (and possibly publication in the Federal Register. The time it takes to get the additional Director's approval adds another month to the 3 month standard process. If it has to go to the FR, the whole process can take up to 10 months, 4 months to get Regional Director's and Director's approval, and 6 months for the publishing of the FR notice, public comment period, and finalization.

Here are some notable restrictions to the managing entrance fees:

1. The USFWS doesn't have the authority to collect transportation fees. Rather they have the authority to raise entrance fees for the enhancement of visitor services which can include the provision of transportation services. A distinction between the different components of the fee can't be made. For an increased fee, entrance to Kīlauea could include a mandatory shuttle. FLREA discourages the layering of mandatory fees (i.e., I arrive at parking area and pay a fee for shuttle and then arrive at Refuge and pay another fee to enter). The visitor should only have to pay once. If however, a non-profit partner or the County was to collect the fee and operate a

¹⁸ Source: 2008 USFWS Guidance on the Recreation Fee Program(pages 4 to 8); The [Federal Lands Recreation Enhancement Act](#) provides the authority - [Section 6802](#)

transit service on behalf of the Refuge that would not violate this rule. In that instance, it would be OK for the Refuge to collect a separate entrance fee as long as the Refuge had no direct role in collecting the transportation fee or operating transit.

2. In justifying the fee increase, the Refuge will have to explain that in addition to using the collected funds to enhance and maintain recreational facilities and activities, they will also need to implement and maintain a shuttle service and/or a Timed Entry System that is part of the whole recreational experience. Lastly, the Refuge will need to prove that this is a viable venture showing at a minimum breaking even or a clear profit after capital and operational costs.
3. The Refuge will not be able to waive a portion of the fee.
4. At per person fee areas, anyone with a pass enters free with up to 3 adults.
5. It is prohibited by the FLREA to charge an entrance fee for youth under 16 years of age. You can only charge a fee for youth under expanded amenity fees such as an interpretive tour.

The administrative process to raise the fee involves the following steps:

1. The Refuge would notify the Region of its intent to raise its entrance fee. The first decision that is needed is to determine how the fee increase proposal is going to be put together to best address both non-transportation and transportation needs. The Region will assist the Refuge in making a determination of how much of an increase is needed and the timing of when collection would begin. While it is theoretically possible to increase the fee in phases as new services come on line, it would be unprecedented to do it this way. Additionally, the fee increase proposal would go up to would need to be commented on by the public and subsequently approved regionally or by the Director. It would also be critical that the timing of each increase be made clear to the public from the beginning. Therefore, it might make the most sense to determine the greatest amount needed and move to raise the fee all at once – not in phases. Another option would be to go through the process first for the non-transportation related visitor services fee increase and then go through the process a second time to increase the fee for transportation related services. Again, while this is an option, it doubles the effort and will take longer to get everything approved.
2. A market analysis would needed to determine the traveling public's price tolerance for transit and/or a timed entry system and how that matches up with the amount of an increase that is necessary to sustain the operations of the new systems.
3. Although it's not required, it's highly recommended that the Refuge conduct public outreach meetings to discuss the prospective fee increase and what residences and visitors could expect from the enhancements the Refuge plans to provide.
4. Upon completion of the market analysis and public outreach, the Refuge would issue a press release announcing their intent to raise the entrance fee and as a means to provide enhancements to visitor services, as well as maintain existing services and facilities.
5. The public would be given 30 days to comment.
6. Depending on the public's response, the Refuge would withdrawal or revise its proposal if the public's response is controversial. A proposal becomes controversial if one or more people from

the community object to it. If the proposal is non-controversial, the Refuge would then likely follow the Regional approval process which takes around 3 months to complete.

7. If the proposal is controversial, it would still need to go the Regional approval process before going to the USFWS Director and on the Federal Register (FR) for another public comment period.
8. Once the FR comment period had closed and the proposal had received approval from the Director, the Refuge could then proceed with starting to collect the new fee. The time frame needed to complete the longer process is about a year.

Reservation and Timed Entry Systems (3+ years)

Reservation or timed entry system requires that visitors reserve, or be issued in advance, the day and time they will enter a site or take a tour or shuttle. These systems can be used to manage visitation to parking or shuttle capacity, or a future Refuge designated visitor capacity. These systems can also provide the Refuge advance notice on forthcoming visitor demand to access or park at the site. Knowing visitor demand ahead of time can inform the amount of staffing, programming, or transit service that would be needed each day.

The terms reservation system and timed entry system are often used interchangeably. The premise is the same, and a timed entry system is a reservation system. Reservation systems commonly refer to a system that allows a certain amount of reservations every day but may not designate time the visitor can come. Rather they are told on the day of their reservation they may enter any time after 10AM and must exit by 4PM. A time entry component is added when a site has limits on the number of people or vehicles it can handle at any given time. The site could be limited by space on a guided tour, transit vehicle, parking lot, or a policy that caps the number of visitors on site at a time.

The parking and space limitations at the Point led the project team to recommend that if the Refuge pursues a reservation system it should include a timed entry component. The downside for visitors is it does not allow them to be as flexible in planning their day. However, these systems can be designed to allow a certain amount of spots be reserved weeks or months in advance, for those that plan ahead, and the rest of the reservations remain available up till the day before or even upon driving up to the Refuge.

It is recommended the Refuge pursue a reservation or timed entry system as a medium term timeframe access management strategy. As the mandatory shuttle is the Refuge's most ideal long term access management strategy, the use of a reservation or timed entry system should be coordinated with how that strategy evolves. If the shuttle pilot does not work or is significantly delayed, the Refuge could consider this reservation tool for management of visitor vehicle access to the Point. If the shuttle is permanently implemented, the Refuge may still need a timed entry system if the transit becomes overcrowded or future Refuge policy is implemented to manage/limit the number of overall visitors coming to the Point on a given day.

It is recommended if the Refuge decides to pursue this management tool, they use a contractor to conduct an analysis of potential reservation and timed entry options. The analysis would look at the possible scenarios, estimate how many cars or people the Refuge could move through the site in a day, estimate revenue gains or losses, and examine potential effects to visitor experience and staffing needs based on different reservation structures. A brief overview of the structure variations and some initial recommendations and considerations for the Refuge are presented in this document (pages 45-47). An example outline for a scope of work for a contractor to conduct this analysis is included in Appendix C.

Structure variations for reservation and timed entry systems

Reservation and timed entry systems are often set up to either require all visitors reserve in advance, or allow a hybrid system where a certain percentage are available in advance and the rest are available between 1-3 days prior to a visitor coming to the site, the day-of, or even upon driving up to the entrance. Hybrid systems are most often used because it allows for visitors who pre-trip plan to set their schedule in advance, while also still allowing last minute or more spontaneous travelers opportunity to visit the site. A hybrid system for the Refuge will ensure that most visitors still have opportunity to see the Refuge, even if they don't decide to reserve months in advance.

A drive-up option, where a certain percentage of entries are held for incidental visitors, may not work well at the Refuge. The limited space at the Overlook gate means that visitors with reservations will still queue during some parts of the day. If vehicles with a reservation are mixed with vehicles driving up to see if spaces are still available, it will be difficult for the Refuge to move vehicles with reservations through and on to the Point. However, a kiosk in town and smartphone applications could serve this function, and allow for the last minute visitor to still have opportunity to get into the Refuge. If the system is used to manage transit ridership these kiosks could be located at the park and ride. Ultimately, because capacity at the Overlook and Point will always be limited, visitor education needs to instill in visitors the idea that they should plan ahead to visit the Refuge. The more visitors can be encouraged to make a reservation before they ever reach the Overlook, the easier it will be to reduce congestion and confusion at the site.

Intervals or design valves for reservations (number of cars allowed in and how frequently) can also vary. The USGS 2011 survey reported most visitors stay about 1 hour. So a structure that allows 60-75% of the capacity of parking spots to be reserved every hour could be a likely scenario. It assumes a % of visitors may stay longer than the hour. Additional restrictions to the reservation, like instructing a visitor that they must enter within 10 minutes of their scheduled reservation time or it is void, or telling them they must exit the Refuge within 1-1.5 hours after they enter, could also better manage the number of cars entering and exiting at any given time. Each variation has planning considerations regarding if or where cars waiting would stage. Again, the contractor analysis would need to examine these scenarios. The analysis could include looking at Refuge staffing support to facilitate each scenario.

The structure of the system would also need to include access policies for staff, volunteers, vendors, and/or family and friends of Refuge staff coming to the Point. As the Refuge would not require these groups of visitors to have a reservation, a policy and/or pass to allow them access when needed will need to be included in the design of the reservation system.

Managing the entry system

It is suggested any timed entry system be call-center and web based. The Refuge would work with a third party vendor of reservation services to facilitate system set-up and implementation. This web-based approach would allow for a wide range of reservation management tools, and would be flexible and scalable enough to meet the future needs of the Refuge.

The system could manage advance reservations, and allow for reservation changes and cancellation. Specific components of the reservation system should include:

- Make, verify, or modify reservations;
- Search park availability;
- 24-hour internet access to the reservation system;
- Review reservation history; and
- Cancel reservations.
- Establish a process and policy for group reservations

Recreation.gov is part of the Recreation One-Stop E-Gov initiative that provides a single point of access to information about Federal recreational activities and reservations. *Recreation.gov* is the contracted provider of reservation services for all federally managed parks and public lands. While a USFWS station could pursue using another system/venue for managing a reservation system, they would have to provide reasonable justification, such as Recreation.gov does not offer a service/element they need, in order to pursue another vendor.

Recreation.gov offers three main sales channels for customers to make reservations: Internet, call center, and in person at field locations. A nonrefundable *Recreation.gov fee* would be required for each reservation to cover the transaction cost charged by the *Recreation.gov* contractor. *Recreation.gov* fees would vary depending on how the reservation is made. The *Cost to the Visitor* section provides an estimated range on these fees.

The USDA Forest Service currently manages the contract with ReserveAmerica, Inc¹⁹. The contract is set to expire in 2016. It is unknown at this time whether they will remain the provider of Recreation.gov, or if another contractor would take over. A switch in contractors could also change the services Recreation.gov would provide. It is recommended if or when the Refuge wants to pursue a reservation system they contact their Regional Visitor Service Specialists to discuss current options and policies on developing reservations systems²⁰.

Infrastructure Needs

Depending on the structure of the reservation system infrastructure needs will vary. Ticketing kiosks at or near the site (e.g., in town, at the agriculture park, or similar) could be necessary to allow people to print their reservation, or allow incidental visitors to make last minute reservations. The entrance gate could need to be updated to allow visitors with reservations to scan or enter their code. Options where USFWS staff use a smartphone application or hand-held reader to perform this task may be easier to implement and reduce capital costs initially, but in the long-term operational costs for USFWS staff time would increase if staff were required to always serve in this role at the entrance gate. Therefore, it is recommended an automated gate eventually be installed to serve this function.

Outreach to Visitors

When a site changes the policy for how visitors can access it, there is typically an orientation timeframe for visitors to understand the new policy. According to a recent Visitor Survey conducted by the U.S. Geological Survey USGS, 40% of visits to the refuge are incidental. That means with a reservation system, initially the Refuge could be faced with the challenge of not filling all reservation spaces, having available parking, and still having to turn people away because they didn't show up with one. Or still seeing a lot of last minute visitors crowding the Overlook inquiring about getting on to the Point. An outreach campaign would be necessary in advance of implementing this system and in the first couple years of operation. The more communication to potential visitors that can happen upfront and on a regular basis, the more they can be encouraged to reserve ahead of time. This will result in less crowding and confusion at the Overlook.

¹⁹ http://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprd3806156.pdf

²⁰ Subscribing to the interagency Recreation.gov Explorer for news and highlights from the Recreation One Stop program, including tips and hints for using Recreation.gov and upgrades in technology, functionality and services is recommended for stations interested in pursuing a reservation system. Contact your Agency Technical Representative (ATR) and ask them to add you to the mailing list.

Implementation Costs

Implementation costs consider start-up and ongoing administrative, capital, and operational and maintenance costs for management of the system. Administrative costs would include staff time to participate in the initial options analysis, moving the preferred alternative through to implementation, and conducting ongoing coordination and monitoring of the website provider. Capital costs include some equipment purchase of ticketing machines and/or upgrades to the entrance gate to allow people to scan or enter a reservation code. Operations and maintenance would largely be managed through the website. The reservation fees charged the visitor would cover the Recreation.gov operations but some USFWS staff resources to assist visitors with reservation questions or confirm reservations as visitors enter the Refuge may also be required.

It is not anticipated the Refuge would need to hire or dedicate a full position to managing this system, but rather a portion of a staff member's time would need to be dedicated to coordination and oversight of the reservation system. Table 6 provides an estimated range for all costs based on recreational sites that have explored establishing these systems. Not enough sites have implemented these systems yet, and the individual needs of each recreational site lead to a wide range of what the cost of implementation could be. The estimate is conceptual at this point and would need to be refined in the contractor analysis.

Table 6: The Range of Estimated Cost for Implementing a Reservation System

Cost	Start-Up Range	Ongoing Range ²¹
Administrative	\$70,000-\$125,000	\$10,000-\$15,000
Capital	\$10,000-\$100,000	\$5,000
Operations and Maintenance	\$5,000-\$15,000	\$5,000
Total Estimated Cost	\$85,000-\$240,000	\$20,000-\$25,000

Cost to the visitor

The use of a website to host and process reservations will charge a service fee for processing reservations. It is not an entrance fee, but rather a reservation or transaction fee the visitor pays to make and guarantee the reservation. Depending on what functions the reservation site provides visitors (cancellations, modifications, etc.) this cost will vary. Looking at other sites using timed entry systems, service fees seem to range from \$1.50 to \$5 per transaction. This reservation fee would be subject to the same fee increase approval process discussed in *Entrance Fee* section of this chapter.

Recreation sites using timed entry systems²²

- NPS Independence Hall
- Ford's Theater
- Yosemite National Park access to Cables at Half Dome
- WWII Valor in the Pacific National Monument access to the USS Arizona
- The Statue of Liberty and Ellis Island
- Arches National Park
- Muir Woods National Monument

²¹ Reservation systems are largely customized by each station or unit. The elements a station wants Recreation.gov to include will influence the capital and operational costs, and the final reservation fee the visitor will pay. The contractor study would help the station work out these details. This table presents a range based on talking to a few NPS units about their estimated costs for implementation.

²² The first five sites in the list are reservations to one attraction or destination within a larger park unit. This means other attractions within the site may still be accessible without a reservation. Arches National Park and Muir Woods National Monument have been considering options that require you reserve a spot and/or time to enter the whole park unit (i.e., allowed through the entrance gate).

Intelligent Transportation Systems (ITS) and Visitor Information Tools/Applications

Intelligent transportation system (ITS) and visitor information tools describe a host of technologies or applications the Refuge could use to:

- Provide visitors information about modes of transportation available to them to access the Refuge, including where they should park;
- Encourage visitors to use a different mode or come at less congested times; and
- Collect and analyze information that can then inform future messaging and access strategies.

This section provides several recommendations for ITS and visitor information tools the Refuge could consider employing. Chapter 4 provides additional recommendations and considerations for placement of static signage to the Refuge. Any use of ITS and visitor information tools should be coordinated with the locations and messaging of static signage.

The 2011 USGS Visitor Survey reported visitors are mostly learning about and finding directions to the Refuge via signs, word of mouth sources (friends, relatives, hotel staff), and printed information. As previously mentioned the survey also reported that almost 40% of visitors to the Refuge said it was an ‘incidental stop’. This means the information they are finding/searching out about hours, access, and fees is often found last minute, likely via web searches, asking hotel staff, or asking businesses in Kīlauea or nearby towns. This is important because in the short term the Refuge could concentrate on what last minute information they want visitors to know, and coordinate with local businesses to share that information. In the long-term the Refuge could concentrate on educating local hotels and tourism websites to promote advance trip planning (‘know before you go’), or telling visitors to reserve their spot or check transit schedules.

In any scenario where vehicle access to the Point is going to be restricted or controlled (e.g., mandatory transit, or reservation only policies are in effect), it will become necessary to try and limit the amount of vehicles that make it all the way to the Overlook without learning about the access options. The space at the Overlook will always be limited, so the more visitors that learn or are directed to the access venue (a park and ride or reservation website) before they get there, the more congestion and confusion at the Overlook can be reduced. Visitor education and information will be an important part of accomplishing this.

A few examples of technologies and tools that might be useful to the Refuge are described below. These tools could be useful regardless of the overall access management policy the Refuge has in place. Only the messaging would change.

Advance Trip Planning and Visitor Transportation Information Services

These are simple, low-cost techniques that use existing websites or services to provide traveler information about access options, when to come, fees and other information. Visitors using websites to find information on the Refuge now sometimes find conflicting or confusing information that may just talk about the Lighthouse. Some of these sites do not make visitors aware of the USFWS website, or that the Lighthouse is on Refuge property. Overall there is an opportunity to develop additional sources for visitors to find transportation and access information related to the Refuge. Further, there is opportunity to make sure the message and information they find is consistent and reflective of the Refuge preferences for visitor access, and current conditions at the Refuge. Some examples the Refuge could pursue include:

- Regular/seasonal updates to hotels, visitor information bureaus, and tourist based businesses

- Some information will be redundant, but regular updates will reach new staff in these locations, and reinforce the messaging about access the Refuge wants to promote.
- If a significant policy change is planned (e.g., moving to mandatory transit or a reservation system) consider holding an open house event for the visitor bureau, tourism authority, hotel staff, and businesses. Use the event to show them the new operation and the messaging the Refuge would like them to share with visitors.
- Updates and corrections to Refuge information on tourism websites
 - Consider taking ownership of both the Kīlauea Lighthouse and Kīlauea Point National Wildlife Refuge TripAdvisor websites. It will allow the Refuge to post relevant information about hours, access, and fees. The Refuge can also respond to posts and clear up misinformation posted by visitors.
 - Work with the Go Hawai'i website to get Refuge information or a Refuge web link added to the Kīlauea Lighthouse page: <http://www.goHawaii.com/kauai/regions-neighborhoods/north-shore/Kīlauea-lighthouse/>
- Regular social media (Twitter feeds, Facebook, Instagram) updates
 - Schedule updates or feeds to go out at peak or non-peak times reminding visitors when is the best time to come. When the Overlook gets crowded, cars begin queuing, or the one-in-one-out policy starts for the day, post reminding people that waiting an hour or two to come will give them a better chance to get in. (Figure 43)
 - In the future share information and reminders about shuttle access and schedules, where to park, and fees.

The costs to do the initial updates listed above are estimated to be \$10,000 to \$15,000 in year one, and less than \$5,000 annually to maintain regular updates. These costs predominantly account for staff labor to create messaging and distribute or issue updates to the appropriate audiences.

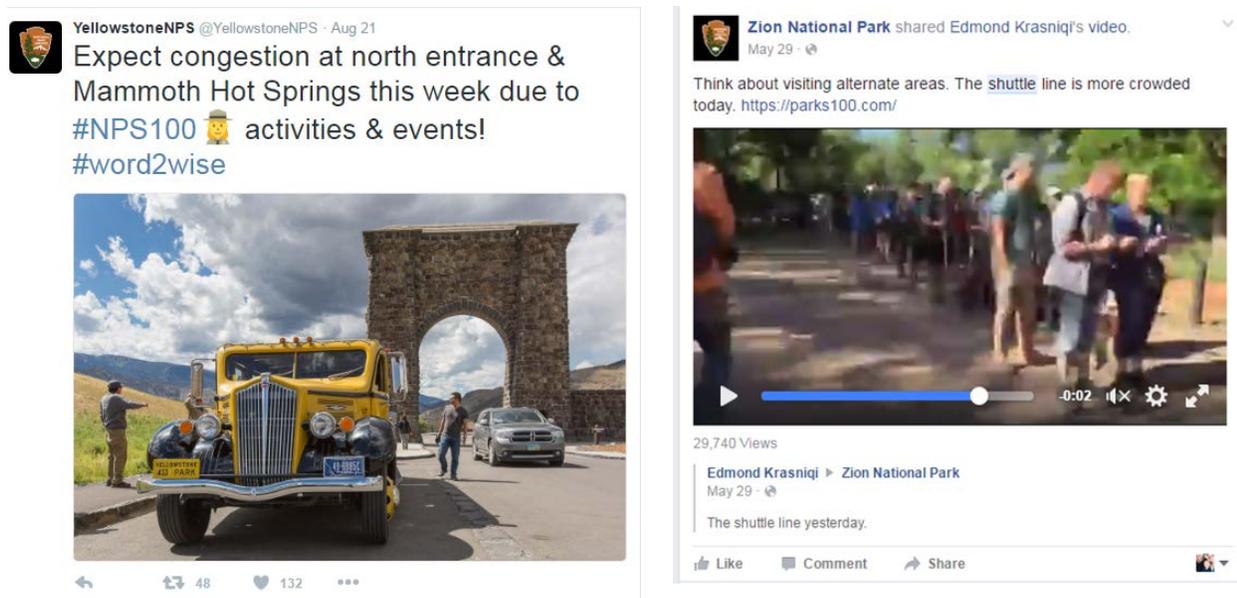


Figure 30: Example posts reminding visitors about access conditions a park or site

Real-Time Parking

Sensors/pucks in pavement could automatically load information to a website or dynamic message sign of how much parking is available at the Point. They can also notify Refuge staff when a certain capacity has been reached, which may lead to deploying more staff to manage cars or shutting the gate. Devices

can also monitor patterns over time providing the Refuge more detailed information to inform future access management decisions.

Real-time puck or counter devices can range in cost from \$1,500 to \$4,000 per unit, depending on what the device needs to be capable of doing. The additional infrastructure (loops, controllers, and cabinets, conduits) to install a device can bring the final cost up to \$30,000 to \$40,000 per site of installation. A design plan, including equipment specifications, sketches, and other supporting site design to install the devices, costs between \$20,000 and \$50,000 to develop.

Dynamic/Variable Message Signs

These signs can be used to provide en route information to travelers. Dynamic/variable message signs (DMS or VMS) can be both permanent (large, non-mobile signs with power and communications hard wired; usually mounted over major roadways) and portable (trailer-mounted) which can be deployed to multiple locations, and typically are solar powered and either cell phone or satellite enabled.

Dynamic/variable message signs at a Refuge or the approach/in their gateway communities could be used for informing visitors about closures, special events, construction, congestion at entrance, parking lot status, arrival of transit, alternative entrances, alternative hours of travel, and locations where the visitor should park to access the Refuge or ride transit.

Costs for temporary or moveable signs range from \$15,000 to \$30,000 for the device and software. The long-term operational cost of the sign can be minimal if the product chosen can be updated remotely, or the Refuge works with the County or State to see if they can assist with long-term operations. However, environmental conditions in Hawai'i, such as salt spray and sun exposure, may lead to more frequent sign replacement. Permanent installations on major routes can cost \$150,000 or more and would likely only be considered if the State or County were also wanting to install one for multiple purposes (such as for tsunami warning or evacuation purposes).

Refuge staff and stakeholders have mentioned that DMS/VMS do not align with the island aesthetic and some stakeholders may not support the installation of these signs. The advance trip planning and visitor transportation information tools discussed earlier in this chapter, as well as the static signage recommendations made in Chapter 4, could provide enough information in lieu of using DMS/VMS. DMS/VMS can be valuable to provide real time information on access options, where to park/stage, or current availability of parking spaces or shuttle capacity. With engagement and support from stakeholders, it might still be considered on Kūhiō Highway. Also, if and when a park and ride is opened for shuttle access, one sign might be considered to direct Refuge visitors where to park.

Other Considerations for Development of ITS

The use of ITS can be limited by:

- Cellular/communication coverage, which can limit the technologies that are readily available. ITS works best when the ability to update the visitor information piece can be done automatically or remotely (versus having to go to the site and manually update a sign).
- The ability to maintain and/or update the tool over time should be carefully considered before choosing or implementing these tools. Limited funding, limited staff, or poorly defined roles and responsibilities can result in the tool being less effective.
- Compatibility with the Refuge, community, County, and State desire, law, and/or existing architecture. If any Highway Trust Funds are used in deploying ITS technologies the project(s) are subject to 23 CFR 940

Parking Lot Management and Reconfiguration

The Overlook (0-3 years)

The Federal Lands Access Program project will help determine the long-term design and operation of the Overlook. Depending on the timeline to implement and construct the preferred alternative, the Refuge may need some temporary solutions to help manage congestion at the Overlook. These could include temporary striping or coning to create a shuttle drop off area, and installing temporary signs to impose parking time limits during peak hours. Imposing parking time limits would be recommended only during peak hours (e.g., 10 minute parking only between 10AM-2PM, or peak hours determined by the Refuge). The Refuge would likely need staff to enforce this, and may want to issue passes to staff, locals, or people with mobility limitations that they would allow to park longer than 10 minutes during these hours. Also, let local visitors know parking limits only apply between the hours designated by the Refuge, and encourage them to visit outside of those hours. In addition to these temporary measures, the Refuge will want to promote the hours visitors should come to the Overlook and/or Point on websites, in brochures, and through social media. They can try to encourage visitors to come at slightly less busy times, and also work with businesses in Kilauea Town to promote this messaging as well.

The Point (3+ years)

Long-term parking in the Point parking areas will need to consider/maintain access for USFWS Staff, special visitors, and visitors with limited mobility, and turnaround for the shuttle. There is also still work to do to determine the best way to get people who arrive at the Overlook on foot and want to get down to the Point. At the Point, eventually design work will be needed to reconfigure the parking lot into a bus turn around and passenger loading area with the fee booth location possibly shifting a bit but staying generally in the same area. While the timeline and funding for this work is being determined, it might be possible to re-stripe a portion of the parking lot to accommodate smaller size transit vehicles and reserve enough parking for staff, special guests, and visitors with mobility limitations

In the event that implementing a mandatory shuttle system isn't successful, there is a possibility that the Refuge could use the revenue from an increased entrance fee to enter into a service contract for traffic operations at the Overlook and at the Point. As part of this study, this scenario was analyzed, but the Refuge indicated that their preference at this time would be to hire more staff instead of contracting the service. It is likely that this would be a more cost effective strategy because the Refuge would have more flexibility to make operational changes and the cost per employee is likely to be less than the costs of contracting service. Beyond paying the contractor, USFWS would also incur administrative costs to manage the contract.

Summary Recommendations

Short term steps assume personal vehicle access to the point is still possible, while the desired long-term solution of a mandatory shuttle is still being evaluated or developed as the permanent access management solution. Medium to long-term options assume one of two scenarios: 1) personal vehicle access to the point is partially or completely restricted, with use of a mandatory shuttle for most visitors (with some vehicle access for visitors with limited mobility maintained); or 2) the mandatory shuttle system is not/or will not be permanently adopted, or implementation has been delayed.

Short Term Implementation Steps (0-3 years)

1. Start the process of increasing the entrance fee.
 - o Work with Region and HQ to determine the fee increase amount based on the configuration of buses, preferred frequency of service, and the package of operations, maintenance, and visitor enhancements (non-transportation services) to be included. Determine anticipated processing time to get the increase approved and implement new fee increase.

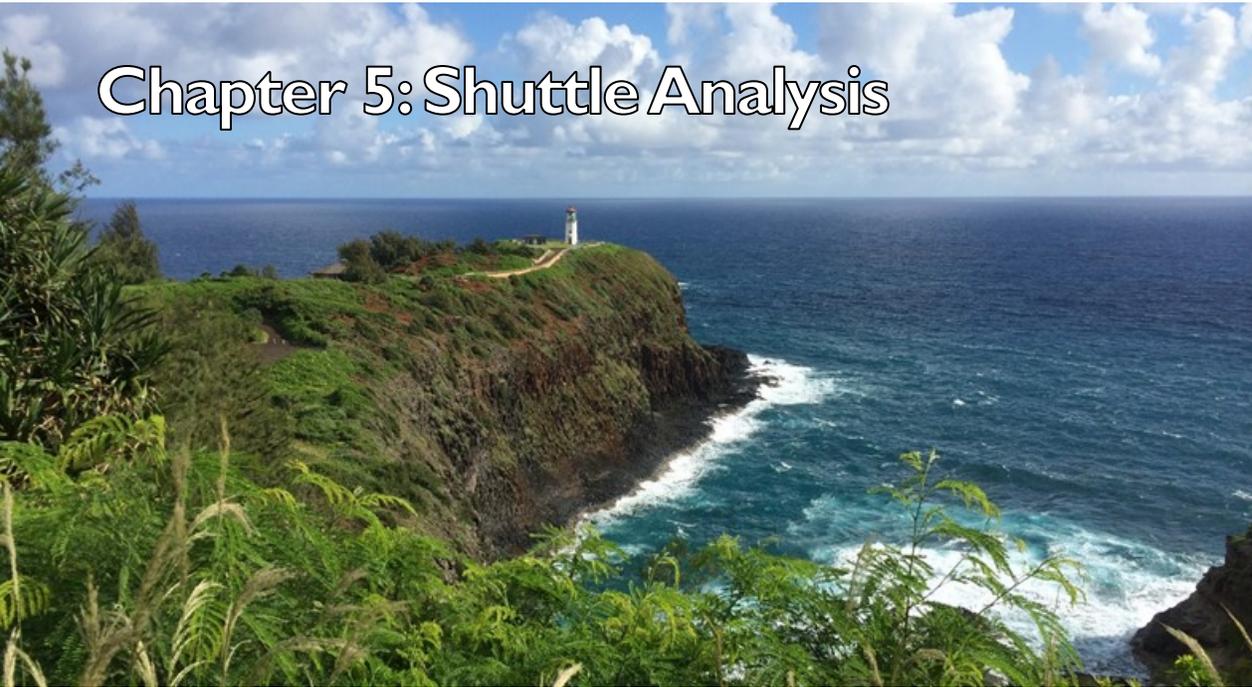
- Conduct market analysis to determine the acceptable range for which the fee can be raised.
 - Conduct public outreach meetings to determine the level of controversy the fee increase may cause and people’s opinions on the value of the services the Refuge proposes to offer.
2. Request Regional funding/support to conduct public meetings and assemble the fee increase proposal package.
 3. Request Regional funding to further refine the cost estimates for a timed entry system.
 4. Coordinate with the County to test the ease of ingress and egress of the different transit vehicle types under consideration for operating at the Overlook and at the Point to inform the fee proposal package.
 5. Continue to work with partners and stakeholders to formalize offsite parking options.
 6. Update/correct visitor information available online:
 - Get links to USFWS website and/or Kīlauea Facebook page added to commonly used Kauai visitor and tourist websites. Consider taking ownership of Kīlauea NWR and Lighthouse TripAdvisor websites.
 - Identify a consistent message(s) Refuge wants to relay in short-term about accessing the Refuge, and get that posted to those websites.
 7. Develop seasonal updates and email blasts to send to hotels, tourism websites, Kīlauea Town businesses, and other destinations tourist frequent. Even if the information or the message does not change, send reminders along with upcoming events at the Refuge.
 - Establish a plan for the dissemination of visitor information as operational changes are made to Refuge access options.
 8. Request funding/get programmed to begin signage plan.
 9. Dependent on timeline for implementation of the FLAP Overlook improvements and shuttle operation, consider implementing a temporary parking time limit policy for the Overlook.
 - Complete compliance, purchase, and installation of temporary parking time limit signs on Overlook.
 - Determine the parking policy on Overlook for USFWS Staff, special visitors, and visitors with limited mobility. Establish a process for how they will obtain passes or waivers.
 - Determine enforcement policy and possibly hire additional USFWS staff to assist.

Medium-Long Term Recommendations (3+ years)

1. Request funding from the Region to design and reconstruct parking at the point to better accommodate transit pickups and drop offs.
2. Eliminate visitor POVs at the Overlook and Point; determine policy for USFWS Staff, community/resident, and visitors with limited mobility to be allowed to park at Overlook and the Point.
3. Reconfigure the parking and turn around areas at the Point and Overlook to accommodate future mode access (assumed at this time to include transit turnaround and bicycle and pedestrian access).

4. Modify messaging with changing access options and operations.
5. If the Refuge does not pursue exclusive transit and pedestrian access, site caps are established, or shuttle operation is not feasible, consider the use of a timed entry system for POVs to better manage visitation levels. Conduct an analysis to examine timed entry reservation alternatives. Once the right alternative was determined, it is important to realize that the Refuge would then need to go through the fee increase process again to cover the administrative cost of managing the new reservation system.
6. If the Refuge does pursue exclusive transit and pedestrian access, work with the Town, community groups, the County, and HDOT to develop future parking and transit hub operations in conjunction with development plans for the Ag Park and eventual bypass road.

Chapter 5: Shuttle Analysis



Summary

Over the past several years, Kīlauea Point National Wildlife Refuge has experienced significant vehicle congestion as visitors queue for a finite number of parking spaces. This congestion has numerous impacts on the environment, visitor experience, and the aesthetics of the Refuge.

One option to reduce congestion on the Refuge is to replace private vehicle access with shuttle and pedestrian access. Changing visitor access from exclusively private vehicles to a shuttle from an off-site hub would allow the Refuge to accommodate some expected increases in visitation in coming years as well as alleviate the parking and traffic congestion problems at the site. Reducing vehicular traffic by implementing a shuttle with an off-site parking hub or hubs may have the added benefit of allowing safe pedestrian access down the driveway to the point for both residents of Kauaʻi as well as visitors. Employing a mandatory shuttle to provide access to the Refuge would be a significant departure from current practice, but it would alleviate many of the existing problems with visitor access while also helping the Refuge move toward long-term sustainability.

A shuttle system would need to accommodate at least 800 visitors per day in its first year of operation and should anticipate accommodating more each subsequent year. The shuttle could operate from three off-site hubs in the area. The simplest and recommended off-site hub is the Community Agriculture Park, which is approximately 0.8 miles away from the Refuge and will have more than enough parking spaces to handle visitors to the Refuge. The next closest off-site hub is the parking lot of the Lighthouse Village development, which should be under construction within the next year. The Refuge could also operate a route beginning at the Anaina Hou facility across from Kūhiō Highway and continuing on through Lighthouse Village.

The Refuge can only expect to be able to operate two types of vehicles on this proposed shuttle because they are the only types that are currently available on the island, are relatively easy to maintain, and offer the most reasonable cost per passenger. These are 30-passenger cutaway type shuttle buses and 12-15 passenger vans. In order to accommodate the expected visitor demand, the Refuge would need to operate two cutaways for the Community Agriculture Center and Lighthouse Village routes, and three cutaways for the Anaina Hou Route; or it could operate three passenger vans on the Community Agriculture Center route, four passenger vans on the Lighthouse Village route, or six passenger vans on the Anaina Hou route.

The cost of providing service may vary based on whether the Refuge employs a full service contractor from the island or takes on various operational aspects, such as vehicle leasing, itself. Employing a full service contractor would be the simplest method but more expensive than leasing vehicles and bidding a contract or entering into a service agreement to operate the vehicles. Quotes from on-island contractors revealed that a full-service contract would be considerably more expensive than leasing vehicles. An analysis of service costs reveal that it should cost between at least \$2.16 and at most \$6.15 per paying visitor to operate a shuttle-only visitor access model (Table 7). The costs outlined here also include driver, fuel, and maintenance.

Table 7: The Range of Estimated Cost Per Visitor for Passenger Vans and Cutaways Operating a Route from the Community Agriculture Center to the Refuge for Two Types of Vehicles and Two Operating Models

Estimates from Local Contractors for 2 Cutaways			
Estimate	Total Annual Cost	Cost per Total Visitor	Cost per Paying Visitor
Low	\$549,520	\$3.28	\$5.13
High	\$620,080	\$3.71	\$5.79
Estimates from Local Contractors for 3 Passenger Vans			
Estimate	Total Annual Cost	Cost per Total Visitor	Cost per Paying Visitor
Low	\$584,800	\$3.50	\$5.46
High	\$658,888	\$3.94	\$6.15
Estimate of Operating USFWS-Leased Vehicles			
Vehicle Type	Total Annual Cost	Cost per Total Visitors	Cost per Paying Visitor
2 Cutaways (+1 backup)	\$286,712	\$1.71	\$2.68
3 Passenger Vans(+1 backup)	\$351,654	\$2.10	\$3.28

This study does not recommend a single approach to managing the operation of the service. The most feasible option is likely a USFWS-administered contract or agreement with a private company or nonprofit organization to provide the service. If the County starts a permanent North Shore Shuttle and would like to extend it to the Refuge, the County could also operate or contract the service under an agreement with the USFWS.

Introduction

The Kīlauea Point National Wildlife Refuge (Refuge) experiences significant issues with private vehicle congestion at the lower parking lot and at the upper overlook at the Refuge. As described in Chapter 2: Existing Conditions, congestion results in frequent parking in undesignated spaces, as well as inadequate flow of traffic in and out of the site, which has the potential to harm wildlife habitat and species and requires one or two staff members to manage during visiting hours. Bicycle and pedestrian access to the Refuge property is also currently prohibited because the Refuge is concerned about the safety of visitors along the steep and curvy access road, in close proximity to high vehicular traffic volumes with low visibility around turns, as well as close proximity to nesting threatened and endangered species.

Changing visitor access from exclusively private vehicles to a shuttle from an off-site hub would allow the Refuge to accommodate some expected increases in visitation in coming years, as well as alleviate the parking and traffic congestion problem at the site, and result in a more serene visitor experience at the Refuge. Reducing vehicular traffic by implementing a shuttle with an off-site parking hub or hubs may have the added benefit of allowing safe pedestrian access for both residents of Kaua’i as well as visitors, a key concern voiced during public outreach for the CCP. Employing a mandatory shuttle to provide access to the Refuge would be a significant departure from current practice, but it would alleviate many of the existing problems with visitor access while also helping the Refuge move toward long-term sustainability.

The project team identified the following constraints at the Refuge that will affect if and what types of shuttle systems would be feasible:

1. The sharp curves and steep grade of the driveway is only safe for relatively small vehicles (30 person buses or smaller) as a larger vehicle would have trouble navigating these turns with two-way traffic regularly during open hours of the day.

2. The Refuge has no existing funding to implement a shuttle service. All of the cost would have to be covered by increasing the entrance fee. However, restricting access to shuttles and increasing the fees would likely result in smaller numbers of visitors, at least initially. The Refuge will need to do a careful market analysis to look at the increasing costs of operations and maintenance for the Refuge, as well as initial start-up cost for the shuttle in order to come up with a reasonable estimate of how much the fee needs to be increased to cover these costs.

This chapter provides details on the various shuttle service options, such as stops, vehicle type, and operating options, which the project team examined to develop a set of recommendations for implementation. These recommendations are detailed at the end of this chapter.

Ridership Demand

To arrive at the recommendations, the project team used a service model that took into consideration existing visitation numbers and recent trends in visitation at the Refuge. These numbers helped to estimate the required number of vehicles and service headways to meet the expected demand.

Visitation Estimates

Since the Refuge envisions a future shuttle service to be mandatory for all visitors who come in their vehicles, market demand may be fairly fixed. Visitation numbers are likely to decrease somewhat if the Refuge institutes a mandatory shuttle, at least initially. To plan for appropriate service levels and capital investment, the project team first estimated the demand for transit based on the Alternative Transportation Study conducted in 2006. This study indicated that visitor demand would decrease by 15 percent with a mandatory shuttle.

Overall visitation since 2005 has not increased as was projected by the 2006 ATS Study. However, the Refuge reduced its operating hours from seven days per week to five days (Tuesday-Saturday) per week in 2014. This reduction in visiting days has increased average daily visitation numbers to new highs as more visitors are accommodated on fewer days. The average daily visitation in 2006 was 640 and in 2015, average daily visitation was 766 with total visitation in FY 2006 being 221,890 and in FY 2015 being 189,275. This analysis only uses the 2015 visitation numbers in order to project demand, because they reflect the current daily demand more accurately than all previous years.

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It is good planning practice to develop a system that can accommodate the 90th percentile visitation day. The 90th percentile visitation day for 2015 was 894 visitors. Visitation is predicted to increase by

two percent in subsequent years, mimicking recent trends in increased visitation that the Refuge and the Island have been experiencing. The target year to start shuttle service is 2018, making the 90th percentile visitation day 966 visitors. Based on the analysis of survey responses conducted in the Alternative Transportation Systems Study in 2006, the project team not only estimates the demand for visitation to drop by 15 percent initially after restricting access to shuttle only, it also expects that two percent of visitors will arrive by commercial tours and will not utilize the shuttle to access the Refuge. Taking these reductions into account leaves a minimum target number of 801 visitors per day that would need to be accommodated on shuttles based on today's numbers. Note that this estimate does not account for a possible reduction in visitation due to an increase in the entrance fee and a potential fee to use the shuttle, which may be significant depending on how much these fees increase. Table 8 identifies anticipated ridership demand for the first five years of shuttle operation.

Table 8: Anticipated Ridership Demand Using 90th Percentile Day

Year of Shuttle Implementation	Year 1 (pilot)	Year 2	Year 3	Year 4	Year 5
Estimated Daily Ridership Demand	801	817	833	850	867

Discussions with Refuge staff indicate that there is only a slight variation in visitation by time of day. The Refuge has not kept records of visitors by hour but estimates that close to 60 percent of all visitors typically visit the Refuge between 10am and 1pm with lower visitation during the last three operating hours based on one survey of vehicles entering the parking lot on a Tuesday and on a Thursday in 2016. Average demand per ten minutes on the morning of a 90th percentile day is estimated to be 26 passengers.

Parking Requirements

The Alternative Transportation Study indicated an average vehicle occupancy rate of 2.7 persons per vehicle who enter the Refuge. Using this number, the project team projected that the Refuge should ensure that there is enough parking available to accommodate the maximum number of visitors that the shuttle system can transport per day divided by the average vehicle occupancy rate (2.7) divided by the average parking space turnover ratio (cars per hour). The average parking space turnover ratio is the average visit of 45 minutes plus the time in transit to and from the Refuge (approximately 16 minutes to and from the Community Agriculture Center). Accordingly, Table 9 estimates the minimum number of total parking spaces required to accommodate Refuge visitors between 10am and 4pm each day for the three stops under consideration.

Table 9: Minimum Parking Spaces Required for Each Potential Route

Route	Minimum Parking Spaces Required
Community Agriculture Center – Refuge	63
Lighthouse Village to Community Agriculture Center to Refuge	67
Anaina Hou to Lighthouse Village to Refuge	73

Potential Stops

Prior to developing its recommendations, the project team evaluated three potential stops for the shuttle. The Community Agriculture Center Complex stop is the recommended location for a shuttle hub because it will have enough parking capacity and, because it is close to the Refuge, it would be the most

cost effective place from which to stage Refuge shuttles. The Refuge may still consider serving the other two locations since they would be feasible transit stops but will likely need some financial participation from other sources prior to doing so as it would add considerable cost and complexity to the operation, and the Refuge would not need to use them to serve its needs. Vehicle requirements to serve each of the stops are listed in Table 10.

Table 10: Summary of Routes from Off-Site Hubs to the Refuge

Potential Stops	Round-trip travel time (with stops)	Number of Vehicles Required to accommodate 90 th Percentile Visitation Day	Service Headways
Community Agriculture Center	16 minutes	2 Cutaways or 3 Passenger Vans	Cutaways: 10 Minutes Passenger Vans: 5 Minutes
Lighthouse Village	22 minutes	2 Cutaways or 4 Passenger Vans	Cutaways: 12 Minutes Passenger Vans: 6 Minutes
Anaina Hou	29 minutes	3 Cutaways or 6 Passenger Vans	Cutaways: 12 Minutes Passenger Vans: 6 Minutes

Kilauea Community Agriculture Center Complex

The County of Kaua’i and the nonprofit organization ‘Aina Ho’okupu o Kilauea began construction of the Kilauea Community Agriculture Center in 2015. This 75-acre parcel is owned by the county and will serve as a regional food hub and agriculturally-based economic development program for the local community, managed by the nonprofit organization. Plans for the Community Agriculture Center Complex include a parking lot with approximately 120 spaces that will serve a community park, outdoor farmer’s market and covered pavilions, and new community field with picnic shelters (Figure 44). The parking lot area will also include restrooms that will be accessible to visitors.

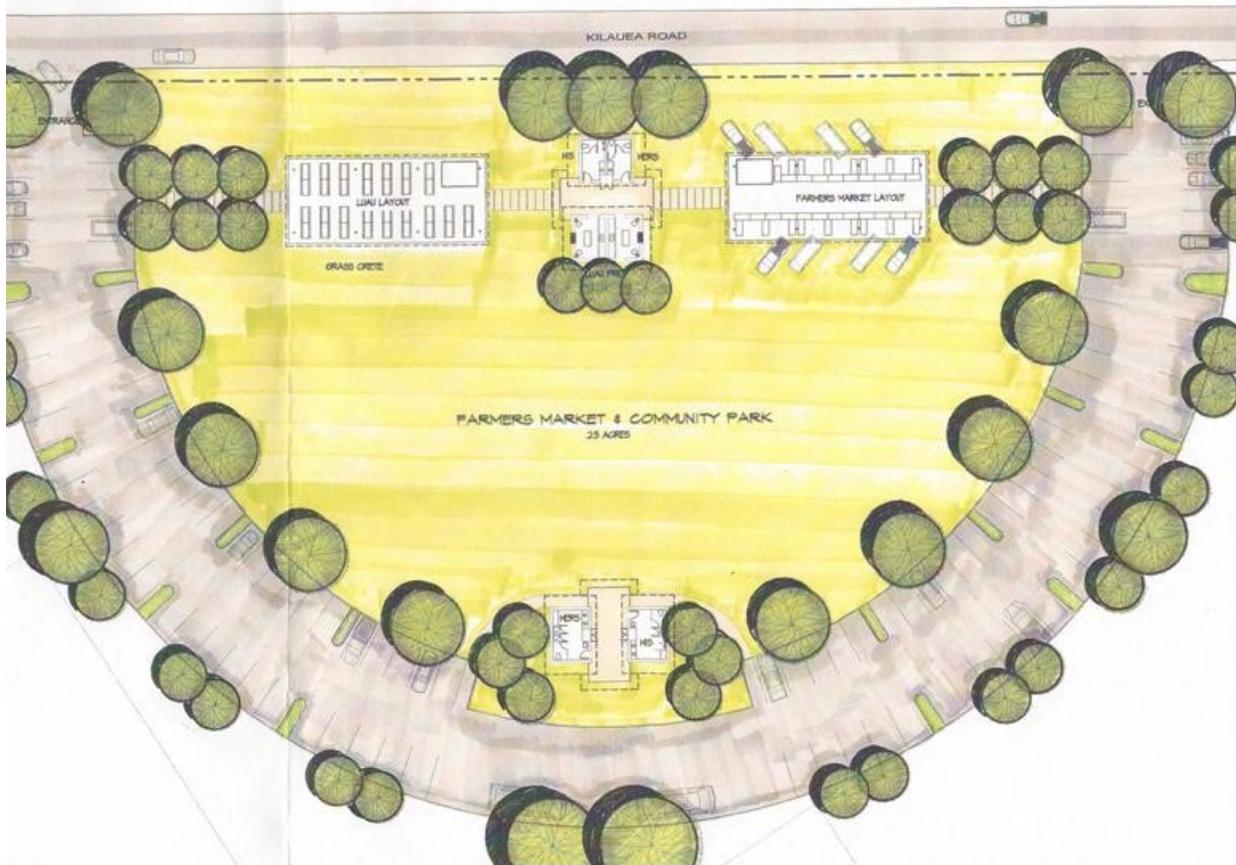


Figure 31: Rendering of Farmers Market and Community Park at the Community Agriculture Center

Both the County and leadership at 'Aina Ho'okupu o Kilauea are receptive to the Refuge using this parking area as a staging point for visitors who would board shuttles to the Refuge property. The parking lot would be located just off Kilauea Road, which is roughly 4,500 feet (0.85 miles) by road to the current Refuge parking lot and fee booth (Figure 45). In order to accommodate the projected demand, a service from the Community Agriculture Center to the Refuge would need to run two 25-30 passenger shuttles or three 14 passenger vehicles (as well as one backup vehicle).



Figure 32: Community Agriculture Center to Refuge Route

At this point, 'Aina Ho'okupu o Kilauea expects to need the parking spaces for the weekly farmers market, which is currently held on Thursday afternoons at 4:30pm at another location. If there is overlap with this weekly event or other events such as luau celebrations, 'Aina Ho'okupu o Kilauea has contingency plans for additional parking if demand requires it.

The nonprofit organization would allow the Refuge to have access to this lot to provide parking for visitors and a pickup location for the shuttle buses. The Refuge will need to pay for its share of maintenance of the facilities such as the restrooms and parking lot since visitors will be the primary users of these facilities.

Kilauea Lighthouse Village

Kilauea Lighthouse Village is a proposed new development that started construction in late 2016. It is located in the center of Kilauea Town across the street from the Historic Kong Lung Market Center and is approximately 1.35 miles from the Refuge fee booth along Kilauea Road (Figure 46). Lighthouse Village is the project of the Hunt Development Group, which has secured several tenants, including a major grocery retailer. A service from Lighthouse Village to the Refuge may be able to meet demand with two 25-30 passenger vehicles but may require one additional 25-30 passenger shuttle or one additional 14-passenger shuttle than what is required to run only from the Community Agriculture Center due to the longer route. The addition of another vehicle and driver to the route would increase the costs for operating the route by about 50 percent.



Figure 33: Lighthouse Village to Community Agriculture Center to Refuge Route

The project team approached the developers of Lighthouse Village about the possibility of locating a stop for a future shuttle at the new development and the owners met the proposal with agreement that it could be mutually beneficial since Refuge visitors could be customers at the shops at Lighthouse Village. The project team estimates that the Refuge shuttle’s constrained hours (10 AM to 4 PM) and the existence of a separate stop closer to the Refuge at the Community Agriculture Center should not result in more than 30 vehicles using the lot at any one time, which should not greatly impact parking availability for shopping center patrons. If Lighthouse Village is the only stop (if the Community Agriculture Center is not feasible), it will require at least 67 spaces to be available at any time.

The Lighthouse Village development includes parking for approximately 230 vehicles, which exceeds the county’s requirement of 202 vehicles. Lighthouse Village Hunt Development representatives mentioned the possibility of using a lot planned for commercial space instead as parking space since that particular site was not proving to be attractive to tenants. This change in the site plan allowed for the addition of 14 new parking spaces (Figure 47 in red circle).



Figure 35: Anaina Hou to Lighthouse Village to Community Agriculture Center to Refuge Route

Anaina Hou is a community-building non-profit organization that is home to several arts, education, and recreation opportunities with a Mini Golf Course and botanical garden, an amphitheater and school under construction, and access to a playground and five-mile trail. Additionally, the site has an on-demand Kaua'i Bus stop with ten dedicated parking spaces. Anaina Hou expects to be finished with construction of the amphitheater and parking lot within three years.

During a stakeholder meeting, Anaina Hou staff welcomed the idea of being a potential shuttle hub for the Refuge as it aligns with its community-driven mission and will have enough parking spaces available to accommodate Refuge visitors during the 10 AM to 4 PM time period so long as it is just one stop among two or three. Anaina Hou plans to offer a lot of parking because the County requires it to have many spaces to accommodate demand at its amphitheater. However, the pavilion will not always be in use during the daytime when the Refuge shuttle would operate and Anaina Hou staff think that there would typically be plenty of space to accommodate the 15-20 cars that might use it to access a shuttle bus to the Refuge during that time, with the remaining visitors accessing the shuttle at the Lighthouse Village or Community Agriculture Center stops. The staff at Anaina Hou expected to offer a number of its parking spaces free of charge if the Refuge wanted to run a shuttle from this location in conjunction with other stops in town.

Potential Vehicle Types

The project team used a service and cost model to compare various vehicle options that the Refuge could use for its shuttle. The roadway geometry, particularly the driveway between the gate and the Refuge fee booth, constrains the shuttle options to 30-passenger vehicles or smaller. The island environment wears on vehicles quickly due to salt water spray, intense sun and rain, and other factors. Additionally, the Refuge must consider vehicle procurement and mechanic service options carefully

since options are more limited in Hawai'i than on the mainland. If the service is contracted with a provider on the island, the provider's vehicle(s) could be tested before service begins. If a vehicle is not procured via an on-island provider, then the Refuge will want to carefully explain the geometry of the driveway to the vehicle provider and perhaps have them visit so that an appropriate vehicle will be selected. Several vehicle types identified as being feasible and desirable for shuttle service to the Refuge along with the associated procurement options and estimated costs are outlined below. The project team recommends using traditional cutaway transit vehicles because they are the most cost-effective option, are widely used on the island today, and would be available through leasing by the GSA. The passenger vans could also be used and easily procured on the island. Other vehicles considered would need to be purchased specially for the KNWRC, which does not seem feasible with the funding available. All vehicles that the Refuge uses should be ADA compliant.

Open Air Shuttle/Tram

Open air shuttles and trams provide the Refuge an opportunity to create a shuttle service that better aligns with the aesthetic of the tropical island. Stakeholders and Refuge staff expressed interest in having a shuttle system that fits in with the natural and relaxed environment as well. The project team selected two trams of this type to compare (Table 11). A special consideration of these trams is that they can be purchased with a special corrosion-resistant package, which may assist the Refuge in maintaining the tram. These vehicles may not be leased in Hawai'i.

Table 11: Comparison of Tram Models Considered

Tram Model	Classic American Tram	President 5000 Tram
Manufacturer	Specialty Vehicles	Specialty Vehicles
Capacity	35 passengers, plus wheelchair accommodation	18 passengers, plus wheelchair accommodation
Fuel Type	Gasoline	Gasoline
Miles Per Gallon	7-10 miles	10-13 miles
Estimated Cost	\$150,000 (plus delivery)	\$105,000 (plus delivery)
Procurement Options	Purchase only	Purchase only
Used By	Ding Darling National Wildlife Refuge Concession Contract Tarpon Bay Tram Tours	No other Refuge
Picture	 <p>Source: Specialty Vehicles Website</p>	 <p>Source: Specialty Vehicles Website</p>

Electric Vehicle

Electric vehicles are becoming more widely available and affordable for some transit agencies. Table 12 provides detailed information about a popular electric bus option. To better support the environmental goals of the Refuge, the project team examined the feasibility of the electric bus developed by eBus. Electric buses require battery replacements every six years and Refuge staff mentioned difficulty in

finding on-island expertise or parts for electric vehicles. Nonetheless, there may be opportunities to purchase electric vehicles at a subsidized cost through a Clean Cities partnership with the USFWS.

Table 12: Electric Bus Model Considered

Tram Model	eBus22 Electric Bus
Manufacturer	eBus
Capacity	22 passengers, plus wheelchair accommodation
Fuel Type	Electric
Miles Per Gallon	18 miles (diesel equivalent)
Estimated Cost	\$395,000
Procurement Options	Purchase only
Used By	No other Refuge
Picture	 <p>Source: eBus Website</p>

Traditional Cutaway

The on-island public transit system, Kaua'i Bus, uses a traditional, medium-duty cutaway. This vehicle type is typical of many transit agencies (Table 13). For that reason, all private shuttle contractors contacted that provide service on Kaua'i had this vehicle type available. Additionally, the GSA had cutaways available to lease.

Table 13: Cutaway Model Elements

Tram Model	E-Series Cutaway
Manufacturer	Ford
Capacity	20-30 passengers, including wheelchair accommodation. Recommended size is the large variety (30 passengers)
Fuel Type	Gasoline
Miles Per Gallon	7 miles
Estimated Cost	\$125,000 purchase; \$15,000 per year GSA Lease (includes vehicle only); \$212,000-\$242,000 per year contractor lease (includes driver, insurance, etc.)
Procurement Options	Purchase, GSA Lease, Contractor Lease
Used By	Kaua'i Bus



Passenger Van

Due to the high frequency nature of the shuttle service at the Refuge, passenger vans may be suitable (Table 14). Due to the limited passenger capacity, more passenger vans would have to be used to accommodate the expected visitation, however, they can be cheaper and easier to obtain than some of the other vehicles examined in this study. Passenger vans have a typical service life of 8 years, much lower than the other vehicle types used for typical heavy-use transit services.

Table 14: Passenger Van Model Elements

Tram Model	Passenger Van
Manufacturer	Ford, Mercedes
Capacity	14-16 passengers, plus wheelchair accommodation
Fuel Type	Gasoline
Miles Per Gallon	14 miles
Estimated Cost	\$40,000-\$60,000 purchase; \$3,000 per year GSA Lease (includes vehicle only); \$151,000-\$196,560 per year contractor lease (includes driver, insurance, etc.)
Procurement Options	Purchase, GSA Lease, Contractor Lease
Used By	North Shore Shuttle Pilot provider
Picture	 <p data-bbox="574 1715 829 1745">Source: Ford Website</p>

Cost and Service Characteristics

This section presents the estimated costs of providing visitor access by shuttle. It presents estimates provided by on-island transportation firms for the lowest cost option, a circulator from the Community

Agriculture Center to the Refuge, as well as estimates for providing the service using vehicles leased through the GSA from each more distant stop described earlier. Actual costs of either contracting entirely from a local firm or contracting service using leased vehicles from GSA may be higher or lower, so the USFWS should use these estimates as a guide to understand what kind of revenue would be needed to sustain such a service.

Cost Estimates

The estimated costs presented here are a low and high estimate of what a Refuge-based shuttle system would cost based on quotes provided by private contractors to run two cutaway vehicles at 10-minute headways between the Community Agriculture Center and the Refuge for six hours per day. However, these private contractors on the island indicated that if the service were put out for bid, the cost would likely be lower than the hourly service cost provided due to economies of scale and competition that they are unable to anticipate and include in their estimates at this time. Therefore, the costs provided in Table 15 for contracted service are preliminary estimates and actual costs would likely be a bit lower. The costs are based on several assumptions and inputs that are described in more detail below.

Table 15: Estimated Annual Cost of Cutaway Contracted Service Based on Current Quotes (2 Vehicles)

Estimate	Per Hour Cost of Contracted Service	Annual Contractor Cost Estimates	Refuge Contract Admin	Facility Maintenance	Total Annual Cost	Cost per Paying Visitor	Cost per Total Visitors
Low	\$280	\$493,920	\$5,600	\$50,000	\$549,520	\$5.13	\$3.28
High	\$320	\$564,480	\$5,600	\$50,000	\$620,080	\$5.79	\$3.71

These quotes anticipate a service with two cutaway vehicles for seven hours per day for each of the Refuge’s 252 operating days per year. The Refuge is open from 10 AM to 4 PM, however the service would have to operate for an additional hour of service to ensure the drivers have enough time to get the shuttles prepared and returned to a nearby parking garage/area. These cost estimates also include the cost to the Refuge to administer the contract (estimated as approximately 80-100 hours of a GS-11 staff person or approximately \$5,600) and \$50,000 to contribute toward maintaining the restrooms at the Community Agriculture Center.

The 2005 visitor survey estimated that visitation would decrease by 15 percent if visitors were required to arrive by shuttle. Therefore, year one visitation is estimated to be 85 percent of projected 2018 visitation, which results in a total of approximately 167,319 visitors. Projected visitation is based on a two percent increase in visitation that the Refuge has been experiencing in recent years.

Only 64 percent of visitors in 2015 paid an entrance fee while the rest utilize their Federal Lands Recreation pass and are admitted for free. Assuming a similar distribution, the project team estimated that the Refuge would receive approximately 107,084 paying visitors in year one of service if the shuttle fee is collected at the fee booth. The cost per paying visitor would therefore be the total annual cost of providing this contracted service divided by the number of paying visitors. However, if the fee is collected on-board the shuttle, then more people would pay it since it would be separate from the entrance fee. The column to the far right of Table 15 presents these estimates.

For comparison, the cost of contracting passenger van service is provided in Table 16 below. Four passenger vans would be required to provide the level of service necessary to accommodate the Refuge’s anticipated visitation, which would be double that of the cutaway service (i.e., vans every five minutes instead of cutaways every 10 minutes). That increase in level of service is seen below with the increase in price, as that service would require two additional drivers.

Table 16: Estimated Cost of Passenger Van Contracted Service (3 vehicles)

Estimate	Per Hour Cost of Service	Annual Contractor Cost Estimates	Refuge Contract Admin	Facility Maintenance	Total Annual Cost	Cost per Paying Visitor	Cost per Total Visitors
Low	\$400	\$529,200	\$5,600	\$50,000	\$584,800	\$5.46	\$3.50
High	\$456	\$603,288	\$5,600	\$50,000	\$658,888	\$6.15	\$3.94

Service Characteristics

On the Community Agriculture Center to the Refuge route, if the contractor provides two 30-passenger cutaways, the shuttle service would need to make a total of 33 to 36 trips a day depending on when the last trip to the Refuge would accept passengers. The headways would be 10 minutes with two-minute stops for loading and unloading. Under this level of service, the buses would be operating with an average load of 76 percent of capacity on a 90th percentile visitation day. During peak visitation times on busy days, the shuttles would be operating at capacity and may occasionally be over capacity, therefore requiring visitors to wait for the next scheduled shuttle. An example shuttle schedule is provided in Appendix D. The Refuge could operate the same number of 30-passenger cutaways for the route from Lighthouse Village to the Refuge but headways (and wait times) would be 12 minutes instead of 10 minutes and average capacity would be 90 percent on a 90th percentile visitation day. Operating smaller passenger vans instead of cutaways would cut headways to six minutes for both routes but would require three vehicles for the Community Agriculture Center to Refuge route and four vehicles for the Lighthouse Village to Refuge route.

During a pilot period of two years, the Refuge should monitor the demand for visitation and the shuttle service as the program matures. If an adjusted level of service is necessary, the Refuge should work with the contractor to ensure that the most efficient service is provided and that as many visitors are accommodated as the Refuge is willing to allow.

If adoption of the pilot shuttle is successful, the Refuge may want to consider adding additional stops at Anaina Hou and Lighthouse Village (if the Community Agriculture Center is the first hub). Since Lighthouse Village is under construction beginning in late 2016, it was not a viable stop in the short-term and, because it is farther away from the Refuge than the Community Agriculture Center, would cost more to operate because it would require more vehicle use. Extending the service further than Lighthouse Village would come at additional costs as another vehicle would need to be included into the route. By adding service to Anaina Hou, the shuttle service would help address the community’s concerns about congestion and speeding along Kīlauea Road as well as the entrance to the Town from Kūhiō Highway, however another entity may need to share in the cost of providing this extended service since one additional vehicle would be required to serve Anaina Hou.

GSA Leasing Vehicle

Anticipating the same level of service as with the fully contracted option, the estimated cost of leasing and operating GSA vehicles from each of the potential stops is presented in Table 17. The vehicle leasing cost from GSA does not include driver, fuel, and maintenance costs. Accordingly, the estimates in Table 17 use assumptions explained in the outline provided in Appendix E, which may not capture some hidden costs of operating a service like insurance. Fixing vehicles or ordering parts can take time on the island, therefore a backup vehicle is recommended. Accordingly, each of the results includes an extra vehicle to serve as a backup in case one of the operating vehicles breaks down. In addition, having a backup vehicle would give the Refuge some flexibility to add an additional service vehicle, if the cost of operating the additional vehicle can be covered, during anticipated peak hours in the busiest seasons of

the year to accommodate any demand that may be higher than capacity. The Refuge should follow up with available contractors to determine what the cost of providing vehicle operations and maintenance would be since they are likely to be higher than the average costs assumed in this analysis. It is clear from the estimates that operating a service from the Community Agriculture Center would be the simplest and lowest cost of all routes.

Table 17: Estimated Cost of GSA-Leased Vehicles and Service

Community Agriculture Center to Refuge									
Vehicle Type	Annual Lease Cost	Driver Wage	Maintenance Cost	Fuel Cost	Contract Admin	Facility Maintenance (Restrooms)	Total Annual Service Cost	Cost Per Total Visitors	Cost Per Paying Visitor
2 Cutaways (+1 backup)	\$55,610	\$127,008	\$36,288	\$5,806	\$12,000	\$50,000	\$231,102	\$1.71	\$2.68
3 Passenger Vans (+1 backup)	\$20,760	\$190,512	\$72,576	\$5,806	\$12,000	\$50,000	\$330,894	\$2.10	\$3.28
Lighthouse Village to Refuge									
Vehicle Type	Annual Lease Cost	Driver Wage	Maintenance Cost	Fuel Cost	Contract Admin	Facility Maintenance (Restrooms)	Total Annual Service Cost	Cost Per Total Visitors	Cost Per Paying Visitor
2 Cutaways (+1 backup)	\$59,044	\$127,008	\$52,920	\$8,467	\$12,000	\$50,000	\$309,959	\$1.85	\$2.89
4 Passenger Vans (+1 backup)	\$26,564	\$254,016	\$105,840	\$8,467	\$12,000	\$50,000	\$454,214	\$2.73	\$4.27
Anaina Hou to Refuge									
Vehicle Type	Annual Lease Cost	Driver Wage	Maintenance Cost	Fuel Cost	Contract Admin	Facility Maintenance (Restrooms)	Total Annual Service Cost	Cost Per Total Visitors	Cost Per Paying Visitor
3 Cutaways (+1 backup)	\$82,887	\$190,512	\$83,160	\$13,306	\$12,000	\$50,000	\$431,864	\$2.58	\$4.03
6 Passenger Vans (+1 backup)	\$39,720	\$381,024	\$166,320	\$13,306	\$12,000	\$50,000	\$657,621	\$3.96	\$6.19

By comparing these costs to the estimated private contracting costs, it appears that the GSA leasing approach may be a more inexpensive option. However, it is not feasible to undertake this approach immediately because GSA leasing can take a long time to set-up and it is dependent on vehicles being available at the time of the request as well as how long a vehicle request from the mainland takes to fulfill. A description of the GSA leasing process for Hawai'i is provided in

Appendix F: GSA Leasing Requirements. Additionally, GSA leasing will require a higher amount time dedicated to contract administration by Refuge staff to process and follow up on the paperwork because only a Federal agency may file a request for vehicles.

If the Refuge begins with a full-service contract, it may want to re-bid the service contract without vehicles if GSA leased vehicles become available. In general, service contract costs may be higher in Hawai'i than on the mainland, but by supplying leased GSA vehicles, the Refuge may be able to choose from a more competitive field of service contractors since the contractors will not be required to provide vehicles.

Operating Method

This analysis presents two operating service options that the Refuge should consider as it implements a shuttle system. Plan A is the project team's recommended approach. In either case, the USFWS must continue to investigate the legal requirements for approaches the Refuge is interested in pursuing.

Operating Plan A: USFWS-Administered Contract or Agreement

The Refuge could provide a service operator with vehicles, either by leasing through GSA or purchasing them, and the service operator could operate and maintain them. Alternatively, the service operator could own the vehicles and operate and maintain the service. Either way, there are three types of service models the Refuge should explore:

- Private concessionaire
- Service contract
- A partnership with a nonprofit using a Memorandum of Understanding

An example of a concessionaire is the Ding Darling National Wildlife Refuge Tram Tour. The Ding Darling NWR has a concession contract with a private entity that operates tours on the Refuge, leaving the Refuge largely out of the business of providing transportation. The concessionaire agrees to provide a certain level of service and sets prices on its own in order to operate sustainably. USFWS Regions 1 and 8 have not managed a concessionaire contract and would need to reach out to the administrators of Ding Darling NWR to understand the requirements for putting together such a contract.

The Refuge may enter into a service contract with a private for-profit company, a public partner, or a local nonprofit organization to run its shuttle service²³. A service contract is a legal instrument that reflects a relationship between a Federal agency and another entity when the purpose is to acquire a service. Either of these business models could be used in this option. The Refuge would need to release a Request for Proposals (RFP) and open bids for entities to compete for a service contract. This RFP would initially have to be solicited as a small-business set-aside, which would exclude public partners and non-profits. If there were no small businesses that bid, it could then be resolicited as full and open to allow non-small businesses and non-profits to bid.

The Refuge could also enter into a partnership with an existing nonprofit organization or a public partner under a Memorandum of Understanding/Agreement to provide the service using vehicles leased through the GSA or purchased. The Community Agriculture Center is being managed by a nonprofit organization which has expressed interest in being the shuttle service provider. Additionally, the Refuge

²³ Details of transit service business models on public lands can be found in the "[Alternative Transportation Systems Business Models Evaluation](#)," September 2012.

may be able to enlist an existing or new friends group (which is a non-profit) that may be interested or willing to be the shuttle system provider. Examples of this type of arrangement are the San Diego NWR Sweetwater Marsh Unit and the Santa Ana NWR in Texas. The San Diego NWR is only accessible via shuttle bus that runs every 15 minutes from an adjacent parking lot and is operated by the Living Coast Discovery Center and not by the Refuge. The Santa Ana Refuge has an agreement with a friends group to provide tours of the Refuge by tram but this service is located entirely within the Refuge boundaries.

It is unclear at the time of this report what kinds of restrictions the USFWS places on entering into a Memorandum of Understanding with an existing nonprofit organization to operate this kind of service. The Division of Contracting and General Services would need to be consulted for service agreement sufficiency if the MOU included reimbursement by USFWS to another organization. The only models that exist of this kind are either models where the nonprofit organization handles all visitor services and operates on Refuge land, such as is the case in San Diego, or the nonprofit organization provides a specific service by volunteers within the Refuge boundaries, such as is the case at Santa Ana.

Finally, the Refuge could operate the shuttle on its own by hiring its own staff. The cost difference should not be remarkably different based on the shuttle cost assumptions described in Appendix E. However, USFWS could probably hire a driver at the GS-5 level, which may be slightly lower than the Kaua'i Bus quote of \$36. With benefits and overhead, the Refuge could probably run shuttles with drivers that cost roughly \$30 per hour, which could potentially reduce the cost of providing two shuttle buses per day by about \$20,000 annually. One major caveat to this, however, is that the Refuge would need to hire an additional GS-5 or train additional staff to cover for drivers if a driver were on leave, resigns, or had their employment terminated. Using an outside contractor or partner for this service would allow more flexibility in staffing because the contractor should be able to draw from a larger pool of drivers to cover their obligations to provide service.

Operating Plan B: County-Administered Service

The Refuge can enter into a cooperative agreement with Kaua'i County to provide shuttle service that is coordinated with the future North Shore Shuttle. This model would still require providing dedicated transportation for Refuge visitors from an off-site hub to the Refuge, but the service model would be more integrated with regional transit and the County would administer its own service contract. Adopting a county-administered shuttle service means Refuge staff time would be devoted less to managing the general shuttle service contract and would rely on the County to ensure that the appropriate level of service is maintained by the contractor. It would be expected that the Refuge would assist in writing the proposal and providing any feedback to the County on the performance of the operations. Several examples exist in which Federal land management agencies enter into a partnership with the local community to provide transit service access (Table 18). In this scenario, the private contractor would provide the vehicle or the Refuge would have the option of providing a purchased or GSA-leased vehicle for the contractor to operate.

Table 18: Examples of Federal Lands Agencies with Locally-Contracted Shuttle Service

Agency	Unit	Local Contract
National Park Service	Wolf Trap	Fairfax County
National Park Service	Glacier Bay	Flathead County Transit Authority
U.S. Forest Service	Devil's Postpile	Eastern Sierra Transit

Coordination with the North Shore Shuttle

An integrated service with the North Shore Shuttle would involve two cutaway vehicles operating at 10-minute headways from the Community Agriculture Center to the Refuge and one passenger van making a trip from Kilauea Point to Ke'e Beach at 30-minute headways. The service would therefore alternate

between the two vehicles while the Refuge is open, as shown in Table 19 and detailed in Appendix D. This integrated service would be entirely managed by Kaua'i County, which would operate the service under a service agreement it would develop with the Refuge. The Refuge could also be a partner in a potential future community shuttle that would serve the length of the route from the Anaina Hou hub to the Refuge, connecting up with the North Shore Shuttle.

Table 19: Conceptual Service Schedule for Coordinated North Shore Shuttle Service to the Refuge

Minutes After the Hour	:00	:10	:20	:30	:40	:50
Vehicle	Van	Cutaway	Cutaway	Van	Cutaway	Cutaway

An integrated service has a few clear benefits to both the island and the Refuge. These include better economies of scale (and therefore cost efficiencies) to run a larger service, integration with island-wide public transit that can reduce vehicle trips on the island, and the utilization of County staff, which have more experience with managing service contracts of this kind. There are also some potential downsides of this arrangement. These include the Refuge having less direct control over the service and a risk that if the North Shore Shuttle were to be discontinued, the service contract for the Refuge portion of the contract would need to be bid again.

Under this model, the USFWS would need to contribute the cost of providing the service from the Community Agriculture Center to the Refuge during Refuge operating hours. This arrangement would allow the County to save money on the North Shore Shuttle through economies of scale and the County could report more riders for its system as well. It would also allow this service to be implemented quickly.

The main drawback of this approach is that the USFWS is restricted in its authority to enter into cooperative agreements with public agencies. These restrictions require the County and the USFWS to share a common mission or purpose, such as the protection of wildlife, to start a new service together. It cannot be used as a contracting method to provide simple transportation, unless the County already provided or had clear plans to provide public transportation to the Refuge, in which case the Service would not be a contract, but rather ran by the County with an MOU with the Refuge to guide service guidelines. Therefore, this model is only a preferred model if the County starts up a sustainable Ke'e to Kīlauea North Shore Shuttle service on its own, and funding for this service has not yet been secured. The Refuge can explore a cooperative agreement with the County but should coordinate closely with the solicitor of the Department of the Interior to understand the requirements and restrictions for entering into such an agreement.

Funding Opportunities

Operating a shuttle system is expensive. The cost per daily paying visitor on the recommended service models range from roughly \$2 to \$7, or \$1.50 to \$4 if the Refuge or its partner who runs the service is able to charge all visitors. It is important for Refuge staff to understand the different financial resources available to assist with paying for the shuttle service. This section outlines the funding opportunities potentially available to the Refuge.

Fee Increase

Because of the lack of major outside funding sources, the Refuge will need to rely heavily on user fees to finance the operation of the shuttle system. As a comparison, the average public transit system in the United States receives only one third of its operating funding from fare collection. These systems are more complex and expensive to operate than what the Refuge is proposing, but because the Refuge

does not have outside funding sources like public transit agencies do, the user fees will need to be higher than a typical transit fare.

The Cost and Service Characteristics section of this chapter included a cost estimate per visitor to provide service. Depending on the operating and fee collection method used, it is estimated that the Refuge would need to raise entrance fees by between \$3 and \$5 in order to provide a service with ten-minute frequencies at today’s operating hours from the Community Agriculture Center to the Refuge. If the Refuge increased its operating hours to seven days per week, as has been considered, this cost would likely increase slightly since visitation would not likely increase proportionate to the extension of service.

The Refuge could consider finding a way to require all visitors, including those with annual passes and children, to pay a separate transportation fee. Under this model, everyone who gets on the shuttle would have to pay the transportation fee. Requiring everyone to pay a smaller transportation fee would allow the Refuge to raise the revenue it needs to operate the transportation service without raising the daily rate for non-pass holders (the majority of all visitors) quite as high. However, this model would require visitors to be charged twice: on the bus and at the fee booth. This could slow down visitors trying to enter the Refuge, reduce the quality of their experience, and may engender complaints by visitors about being double-charged, and the Federal Lands Recreation Enhancement Act discourages this practice. It also appears that this practice may not be embraced by the Fish and Wildlife Service, which only uses transportation fees to cover optional visitor services such as tours, and does not charge transportation fees to provide access to its lands.

While the Refuge would like to maintain a reasonably priced entrance fee, raising the fee to above \$10 would not be out of line with similar attractions on the island. A snapshot of entrance fees at other locations in 2016 revealed that the current Refuge price is far lower than most other attractions (Table 20). However, several of these attractions offer guides and experiences that are longer than the 45 minutes that visitors spend on average at the Refuge.

Table 20: Entrance Fees at Other Attractions on Kaua’i

Attraction	Adults	Kids	Typical Duration (hours)
Kaua’i Mini Golf & Botanical Gardens	\$18 (11 and older)	\$10 (5-10)	NA
Mountain Bike Rentals (at Anaina Hou)	\$25		6
National Tropical Botanical Garden			
McBryde Garden	\$30 (self-guided)	\$15 (6-12)	1.5
Allerton Garden	\$50 (guided)	\$25 (6-12)	2.5
Allerton Garden at Sunset	\$90 (guided)	\$45 (6-12)	3
Discovery Combination Tour	\$60 (guided)	\$30 (6-12)	2.5
Limahuli Garden	\$20 (self-guided)	\$10 (college)	1.5
Limahuli Garden Guided Tour	\$40 (guided)	\$20 (10-17)	2.5
Limahuli Garden Family Tour	\$30 (guided)	\$5 (4-17)	1.5-2
Limahuli Garden Specialty Tour	\$75 (guided)		2.5
Limahuli Garden Private Tour	\$100 (guided)	\$50 (10-17)	2
Princeville Botanical Gardens	\$65 (guided)	\$21 (7-16)	3
State Parks	Free	Free	NA

While State Parks do not charge an entrance fee, the Refuge is different in that there is a constant presence of active personnel managing the property and providing services to visitors. To counter any

negative perception from visitors, the Refuge could install a sign or provide literature that explains the ways that the fees help to fund the successful operation of the Refuge.

Federal Lands Access Program

Kaua'i County was awarded a Federal Lands Access Program (FLAP) award in 2015 to study bicycle and pedestrian access leading to the Refuge's entrance gate. The next call for FLAP applications will be open in the fall of 2016 and will program funding for Fiscal Year 2018, 2019, and 2020. Approximately \$262,000 is available per fiscal year. While it is rare, FLAP funding can be used to purchase rolling stock and help with any initial shuttle service start-up costs (e.g., signage). If the County were awarded a full fiscal year's amount of FLAP funding for the state, then the Refuge could potentially purchase any of the vehicle types discussed above, excluding the electric bus. However, the Refuge must also factor in maintenance costs as well as long-term recapitalization that comes with vehicle ownership. Depending on the contracting agreement for the shuttle service, the Refuge would be able to provide the contractor a Refuge-owned vehicle or two to operate.

Hawai'i Tourism Authority (HTA) Transient Accommodations Tax (TAT)

The Hawai'i Tourism Authority (HTA) manages the Transient Accommodations Tax (TAT), which is a portion of the General Excise Tax (GET) related to tourism, concessions, and visitor industries. The TAT funds are invested in a variety of projects that support local residents such as education, police, and infrastructure. Kaua'i County is exploring this option for funding transit projects and would look to the TAT's Kaua'i apportionment to see if funds could be used to help the Refuge's shuttle service, if coordinated with them.

General Excise Tax (GET)

An increase to the statewide General Excise tax (GET) was proposed by the Mayor of Kaua'i to help provide a more sustainable source of funding for transportation projects, particularly transit, on the island. The North Shore Shuttle pilot that took place in the summer of 2014 showed that there was increasing demand for transit options, however, it was not a financially sustainable operation. Kaua'i County would have used some of the funds raised by the increased GET to expand Kaua'i Bus and public transit operations, including re-establishing the North Shore Shuttle that would be coordinated with the Refuge's shuttle service. The GET is currently a 4 percent tax on businesses and would be increased by 0.5 percent from January 1, 2018 until December 31, 2027. The County Council voted down the increase by a vote of 4-3 in 2016.

Recommendations

In order to implement a shuttle system to transport visitors to the Refuge from an off-site hub or hubs, the project team recommends the following approaches to produce the most feasible and cost-effective shuttle system for the Refuge given the parameters as defined at the time of this study.

Selection Criteria

To determine the most feasible and implementable recommendations from the set of options available to the Refuge, the project team and Refuge staff used the following selection criteria:

- I. Ease of implementation: how easy is the service to implement in two or three years? E.g., estimated staff time, fee collection and approvals, availability of partners, vehicle availability, etc.

- II. Cost effectiveness: is the system cost effective and affordable for riders? What impact would it have on entry fees? Is the system financially sustainable?
- III. Environmental impact: does the system take into account environmental impacts?

The project team presents a flexible approach to the development of a shuttle system. The project team presents two recommended plans labeled Plan A and Plan B. Plan A should be followed if the Refuge is able to come up with funds and is ready to implement the shuttle immediately and Plan B should be followed if the Refuge needs some time to raise its fees and transition to a shuttle access system.

Plan A: Implement Shuttle-Only Access (Short Term 0-3 Years)

The Refuge would like to have a shuttle in place within three years of the completion of this study since there is a significant need to take action to mitigate the current intractable situation with parking, safety concerns, and traffic congestion at the Refuge. Additionally, there is support from the County government and partners, as well as momentum on Kaua'i for increasing public transportation options on the North Shore, which would help facilitate the implementation process. As a result of this attention currently being given to public transit options, there may be more possibilities for collaboration with community and government partners.

Under this plan, all visitors to the Refuge arriving independent of a commercial tour will be required to use a new shuttle service or possibly access the Refuge on foot. Private vehicle access to the Refuge property would be prohibited for the general public, except for staff vehicles, and holders of disabled parking placards. The following list outlines the service characteristics selected for the short-term. More details on these characteristics are described below.

- Route: Kīlauea Community Agriculture Center Complex and/or Lighthouse Village to Refuge.
- Vehicle Type: two 30-passenger cutaways operating every 10 minutes; if the Refuge purchases or leases vehicles, a third vehicle would need to be leased or acquired as a backup.
- Operating model: contract with a private company or implement a partnership agreement with a local agency or nonprofit entity.
- Funding: farebox recovery on board the shuttle or other off-site payment system or through an entrance fee increase. There is a potential to access funding from the Federal Lands Access Program to purchase or lease vehicles in the medium-term timeframe.

Route: Kīlauea Community Agriculture Center Complex and/or Lighthouse Village to Refuge

In the short-term, the project team recommends that the Refuge contract with a private company, public partner, or nonprofit operator to run a high frequency shuttle service from the Community Agriculture Center and/or Lighthouse Village to the Refuge. Both locations will have sufficient parking to accommodate visitors, are willing partners, and provide the simplest, fastest, and lowest-cost route for a new shuttle.

Variation: Full Kīlauea Route

Recently, the County expressed interest in the idea of running a service from Anaina Hou, to Downtown Kīlauea, to the Community Agriculture Center, and on to the Refuge. The Refuge could participate in this service if the County or another partner is willing to cover the costs of expanding service from the Community Agriculture Center/Lighthouse Village to other stops in Kīlauea, which would require additional vehicles and driving distance.

Vehicle Type

A cutaway type vehicle has lower operating costs per passenger than all other options under consideration. Since cutaways can accommodate twice as many people as passenger vans, the service would require fewer vehicles to accommodate projected demand. The estimated costs for both a cutaway shuttle and a passenger van are presented in Table 21 and include wheelchair accommodation. Cost is the primary consideration for the Refuge because it has few funding sources except user fees, which the Refuge would prefer to keep as affordable as possible. Also, cutaway vehicles should be in stock and available if the Refuge leases vehicles for the service.

Operating Model

Contracting with an entity that provides all aspects of the shuttle service would be expensive but also the simplest and most feasible operating model from an administrative and logistics standpoint. The cost of this option is estimated to be between about \$5 and \$6 per paying visitor (or between \$3 and \$4 if all visitors paid) based on quotes from island transit operators (Table 21), but these quotes may be on the high end of what the Refuge would actually receive if it released a competitive request for proposals (RFP).

If the Refuge is willing to wait to implement service, it could lease vehicles through the General Services Administration (GSA), which should lower the cost of contracting service because it should open up the pool of potential contractors who could provide service and utilize relatively low cost government leasing. Leasing vehicles would also allow the Refuge to consider operating the service itself. The cost of this option is estimated to be between about \$3 and \$4 per paying visitor. GSA has indicated that it would likely take up to 18 months to be able to bring three cutaway vehicles to the island for lease by the Refuge. Since the Refuge would need to get USFWS headquarters approval prior to initiating a procurement for the vehicle leasing during its acquisition season between October and April and the Refuge would need to have secured funding by that time, the earliest the Refuge could begin using government vehicles would be late 2018 or early 2019.

Table 21: The Range of Estimated Cost Per Visitor for Passenger Vans and Cutaways Operating a Route from the Community Agriculture Center to the Refuge for Two Types of Vehicles and Two Operating Models

Estimates from Local Contractors for 2 Cutaways			
Low	\$549,520	\$3.28	\$5.13
High	\$620,080	\$3.71	\$5.79
Low	\$584,800	\$3.50	\$5.46
High	\$658,888	\$3.94	\$6.15
2 Cutaways (+1 backup)	\$322,066	\$1.92	\$3.01
3 Passenger Vans(+1 backup)	\$351,276	\$2.10	\$3.28

Funding

Requiring visitors to use a shuttle to access the Refuge will necessitate visitors paying for the service as they board the shuttle or an overall increase in Refuge entrance fees to pay for service. Visitor costs are considerably lower today than similar attractions on the island as described in Table 20. **Error! Reference source not found.** A fare or an increase of between \$3 and \$6 (60 to 120 percent) would be necessary to cover the estimated cost of providing the shuttle in addition to the funds the Refuge needs to raise to meet their current operations and maintenance requirements.

Plan A: Implement Shuttle-Only Access (Medium and Long Term 3+ Years)

Looking three years and beyond, there may be some new developments in the community that may affect the shuttle's route. There have been discussions surrounding the construction of a new community access road as a secondary exit off of Kūhiō Highway to enter Kīlauea Town. If this road is constructed, there might be additional incentive for the Refuge and County to coordinate with the construction of the new road and add a stop along the road near Lighthouse Village, if it is not already being used as an off-site hub.

Neither the short- or medium-term plan includes the option of having the Refuge purchase a vehicle due to the high costs of purchase and difficulty of maintaining vehicles on the island. If the Refuge were to purchase a vehicle at any point, the Refuge would need to consider the long-term transmission and engine overhaul costs as well as recapitalization costs that would be incurred.

The County is currently running a pilot for the North Shore Shuttle, with the hope to carry that service forward in years to come. The Refuge and shuttle partner/contractor should work with the County to ensure that the Refuge service ties into both the North Shore Shuttle and existing Kaua'i bus routes to the extent feasible.

Plan B: Phased Approach (Short Term 0-3 Years)

An alternative approach is to initiating a contract that is entirely based on the revenue collected through farebox recovery would be to raise the fees \$2 to cover short-term operational needs as soon as January 1, 2018, and \$3 in 2019. The Refuge could then analyze whether the fee increase has negatively affected visitation. The Refuge could also experiment with a different access management option to use a reservation system, or conduct more active traffic management at the parking lot, as discussed in the Access Management section. Meanwhile, the Refuge could be using a portion of its fee increase to build up its funds to cover start-up costs for the shuttle. After two or three years, the Refuge will have a better handle on the impacts to visitation demand from increasing the fees and implementing other access management strategies such as a reservation system, as well as whether the Refuge needs to increase the fees another \$2 or so in 2020 to cover the cost of a shuttle. By taking this incremental approach, the Refuge can more carefully transition to a shuttle-only access system.

Plan B: Phased Approach (Medium and Long Term 3+ Years)

The Refuge can begin a mandatory shuttle system if it determines that the access management strategies implemented in the short-term are not sufficient to meet its needs and it has built up sufficient capital to begin operation. The ridership demand used to estimate the required number of vehicles and headways should accommodate some modest increases in visitation over today's visitation. However, if the Refuge is experiencing considerably higher demand after several years, it may need to consider running three 30-passenger vehicles instead of two to accommodate demand. Because doing so would be expensive, the project team still recommends applying the same shuttle schedule presented earlier, with the option to add service later in case of higher-than-expected visitation. This transition to more vehicles could be gradual if the service uses one backup vehicle to handle peak visitation hours (of course this would not be possible if one vehicle were out of service).

Conclusion/Next Steps

As outlined above, it is recommended that the Refuge enter into a service contract, concessionaire contract, or memorandum of understanding with a private, non-profit, or public partner to run a shuttle that would be mandatory for all visitors. Under the Plan A scenario, a Refuge-bound cutaway shuttle

would run every 10 minutes from the Community Agriculture Center to the parking lot of the Refuge and the cost of running the shuttle would be passed on directly to all visitors who board the shuttle. Immediate next steps include:

- **Coordinating with the Community Agriculture Center:** The Refuge will need to work with the Community Agriculture Center to establish a firm agreement on using the site as a staging area. In the case that the Community Agriculture Center stops being a viable staging location for any reason, the Refuge should consult with the owners of Lighthouse Village to discuss running a shuttle from there instead.
- **Secure vehicles from the GSA:** The Refuge should begin negotiations with the Hawai'i office of the GSA to lease three cutaway vehicles to provide contracted service after reviewing the GSA Leasing Requirements described in Appendix F.
- **Establish Operating Agreement:** Depending on the service contracting model selected, the Refuge should take the necessary steps to establish an agreement for a private, non-profit, or public entity to provide reliable transit service from the staging area to the Refuge.

Chapter 6: Pedestrian & Bicycle Connections



Pedestrian & Bicycle Overview and Context

In this chapter we discuss the challenges to bicycle and pedestrian travel to the Kīlauea Point National Wildlife Refuge (KPNWR or Refuge) and the overlook and present some ideas for improving the conditions for pedestrians and bicyclists. This chapter mostly discusses options for improving these modes of transportation in Kīlauea Town and leading to the Refuge from the town and other parts of the island, but also discusses some options to consider for long-term accommodation of pedestrians and bicyclists at the Refuge site.

As part of ongoing efforts by Refuge staff to work with community stakeholders towards improving overall transportation safety and access to the Refuge, it is important to consider the needs of pedestrians and bicyclists. The Refuge asked the project team to consider these users due to concerns over safety and evidence of an emerging focus on improving nonmotorized travel on the North Shore of Kauaʻi.

Pedestrians and bicyclists are currently not allowed to access Kīlauea Point proper (hereafter also referred to as the Point). Refuge staff is concerned about the safety of pedestrians or bicyclists who would potentially use the driveway to access the Point. The nature of their concern stems from the fact that the road is too narrow to accommodate sidewalks or trails and that pedestrians and bicyclists would potentially conflict with current two-way vehicular travel on a steep slope. Additionally, there are also two Federally-listed birds, the Nēnē and Newell’s Shearwaters, nesting along the driveway in Hala-Naupaka forest. Nēnē nests are located as close as five steps off the road and Newell’s Shearwater burrows ten steps off the road. These birds would be put in danger if there were any expansion of the roadway footprint or significant pedestrian activity near the existing driveway.

The entrance driveway to the Point lies at the end of Kīlauea Road, a narrow County Road that ends in a cul-de-sac (turnaround). This area (hereafter also referred to as the Overlook) has five paved, painted parking stalls as well as information displays about the native wildlife and plants that can be seen in the area. Approximately 20 additional vehicles can be accommodated along a dirt/gravel section of Kīlauea Road that visitors often use as impromptu parking. The pedestrian and bicycle path adjacent to Kīlauea Road does not currently reach all the way to the end of the road leading to the Refuge entrance. Visitors who arrive by bicycle or by walking must use the vehicular traffic lanes to walk or bicycle to the Overlook and the entrance gate.

The posted speed on most of the portion of Kīlauea Road without a separate path is only 15 miles per hour. The reason for the slow speed limit is to protect the Nēnē, which cross the road to access Refuge habitats and are vulnerable to passing cars because they don’t always move out of the way quickly. Community members, however, have indicated that visitors often travel much faster than this speed limit and at speeds that make sharing the road less safe than if all vehicles adhered to the posted speed limit.

Kauaʻi County is trying to increase safety and access for bicyclists and pedestrians. This effort is consistent with a statewide effort to improve the safety of nonmotorized travel in Hawaiʻi, which recently resulted in the adoption of the Hawaiʻi Pedestrian Action Plan. One policy the County adopted that reflects this new priority was to install bicycle lanes on all new or reconstructed roads in the County. There is also an organized community effort, led by the nonprofit advocacy organization Kauaʻi Path, to build an island-wide trail system. Kauaʻi Path recently developed an alternatives analysis for a proposed path system on the North Shore of Kauaʻi that includes access to the KPNWR.

Stakeholder Input

Volpe and CFLHD staff met with business leaders in Kīlauea Town, community stakeholders at the Refuge, and Refuge staff in the fall of 2014 to listen to and discuss concerns and hopes for improving

transportation access near Kīlauea Point. While all of the consulted stakeholders were generally in favor of improving nonmotorized access, the discussions revealed some important differences and considerations.

Kīlauea Town businesses

Some business leaders were skeptical that bicycle travel would ever be a significant mode of transportation on Kauaʻi due to the great distances between destinations and the challenging topography of the island that makes bicycling difficult for most people. However, other business owners within Kīlauea Town recognized that transportation preferences are changing and eco-tourism and active healthy tourism activities like bicycle tours may increase on the island, particularly if Kauaʻi Path is successful in its efforts to connect the island by trail. While much of the topography may make bicycling challenging to the average visitor, there are more serious bicyclists who would choose this option if it were available. Kauaʻi also has an ideal climate for outdoor recreation and active transportation. Local business leaders further acknowledged that improving bicycling and walking conditions within the town may increase nonmotorized transportation by residents making local trips or accessing the Kauaʻi Bus.

KNWRC community stakeholders

Community leaders held different opinions about the expansion of bicycle infrastructure on the North Shore. Some welcomed the effort and fully supported the development of a nonmotorized transportation network to offset the auto-dependence of the island and to provide low-cost travel options for residents. However, a community leader expressed concerns about the impact of building new trail connections across waterways. The *North Shore Path Alternatives Report* discusses the possible construction of a pedestrian bridge across Kalihiwai Stream near the beach in a location where a bridge once existed before being washed out by a tsunami in 1957 (Figure 36). This bridge would connect Kīlauea town to Kalihiwai and Princeville by trail. Some residents are strongly opposed to the construction of any new bridges across Kalihiwai Stream or other crossings because they fear negative environmental and social impacts. Construction of the North Shore Path will encounter this resistance and will need to find creative ways to provide safe connectivity without disturbing the delicate historic and natural balance of the North Shore.

The Kīlauea Town Plan and the resident stakeholders both indicated a desire to slow down traffic in town on Kīlauea Road. There is a perception that many visitors from the mainland drive faster than is safe or desired on island roads. While there is no hard evidence of vehicles driving too fast, traffic calming efforts may both reduce speeding and improve pedestrian and bicycling conditions.

Refuge management

Refuge staff are interested in providing better access to visitors who arrive on foot or by bicycle to the Overlook, but there are safety and natural resource protection concerns. The Refuge is interested in restricting private vehicle access to the Point partially because it would improve the safety of pedestrians as there would be more space on the driveway to accommodate pedestrians and the occasional vehicle. The Refuge currently receives visitors who arrive without a vehicle from time to time. These visitors must share Kīlauea Road and the access road with motor vehicles. Regardless of whether private vehicle access is restricted in the future or not, the Refuge will continue to find ways to accommodate pedestrian visitors.

Existing Constraints and Opportunities on the Refuge

There are a handful of limitations and considerations related to improving the conditions for pedestrian and bicycle access to Kīlauea Point. The primary concerns of the Refuge when considering improving pedestrian and bicycle access are endangered species impacts and safety-related.

Road geometry on the Refuge

The primary constraint to providing safe pedestrian and bicycle access on the Refuge is the narrow width (16 feet) and steep grade (greater than 15 percent in the section near the gate) of the 0.12 mile entrance road. This width is adequate for most vehicles to pass one another at slow speeds but there is no additional room to maneuver. The KPNWR Alternative Transportation Systems Study from 2006 indicated that the entrance road could be widened by a few feet to accommodate a sidewalk or trail but that this construction would likely have adverse effects on wildlife and habitat and may be expensive to construct due to the topography.

Proximity of endangered species

The Refuge has indicated that so long as private vehicles are using the Refuge driveway, pedestrians and bicycles will remain prohibited from the entrance gate down to the Point. The rationale for this includes visitor safety and resource protection. In addition to the road being narrow with blind, steep curves, there are two Federally-listed birds, the endangered Nēnē and threatened Newell's Shearwaters, nesting along the roadway in Hala-Naupaka forest. Nēnē nests are located as close as five steps off the road and Newell's Shearwater burrows ten steps off the road. There are also many Shearwater nests within two steps of the roadway. Currently, pedestrians sometimes wander off the road into the Hala-Naupaka forest, where they could easily crush chicks or burrows or flush a Nēnē brood or bird off its nest. Bicyclists, like runners, are likely to startle Nēnē along roadways as well. Any road widening or Americans with Disabilities Act-compliant pathway would likely adversely affect listed birds unless it is carefully designed to avoid direct impacts.

Consideration of previous recommendations

The CCP indicates that there will not be pedestrians and bicycles allowed on the steep driveway down to the Point. Yet there are a number of changes to the driveway that could be made in the future to make it safer for these users. The 2006 alternative transportation study for the Refuge offered that bicycle lanes or sidewalks could be included in a widened reconstructed entrance road. However, this study recognized that this option may be expensive and would negatively impact the natural habitat. The project team does not recommend this option for three reasons:

- Paving or similarly altering Federally-listed bird nesting habitat would run counter to the objectives of the Refuge.
- Once private vehicle access is restricted and access is provided by a shuttle to the site, a wider road will not be necessary to accommodate both small transit vehicles and visitors who arrive on foot or by bicycle, since the existing roadway geometry should be adequate.
- The speed limit on Kīlauea Road near the entrance to the Refuge and on the entrance road is 10 miles per hour. Separate bicycle facilities are not recommended for roads with such slow traffic.

Shared space driveway

The CCP does not include a strategy to change the entrance road to the Refuge. However, once this road is due for reconstruction, and if the Refuge does not implement a mandatory shuttle service, the project team proposes to re-conceptualize the Refuge entrance as a shared driveway rather than as a road because of the recognition that pedestrians and bicyclists may come to the Refuge regardless of official

policy. Treating this driveway as a shared space will require the addition of several features that provide visual cues to drivers that they must proceed at a very slow pace so as to improve the safety of any pedestrians who may be using it. Some possible features of a shared space driveway include:

- Textured pavement
- In-pavement stencils (Figure 34)
- In-road landscaping such as potted trees, plants, sculptures, or bollards to create “chicanes” requiring drivers to steer around them as they descend the driveway (Figure 35)
- Speed humps on the lower portion of the driveway near the parking lots (speed humps would not be feasible on the higher grade portion of the driveway) (Figure 38)
- Signs that clearly indicate that the driveway is to be shared between bicycles, vehicles, and Nēnē. The Refuge could order a specialized sign as this private driveway would not be subject to Manual of Uniform Traffic Control Devices (MUTCD) requirements.
- Reducing the speed limit to 5 mph with speed limit signs



Figure 36: In-pavement stencils. SOURCE: FHWA



Figure 37: Chicanes. SOURCE: www.pedbikeimages.org/ Dan Burden

Extremely slow moving traffic can safely coexist with pedestrians and bicyclists. Roadway designers throughout the world have accepted the “shared street” concept. While it is typically applied in residential and commercial areas, the same concept could be applied in this context along with the addition of some of the visual elements listed above that communicate to drivers that they must drive slowly and carefully.

Alternatively, if access by shuttle becomes mandatory, the road could also be reconstructed to have one lane dedicated to the shuttle and other Refuge vehicles, with a separated area for pedestrians to walk. This pedestrian space would still need to be on the same roadway bed as the driveway so as to allow the occasional outbound Refuge vehicle to pull over to allow a shuttle to proceed inbound. The project team proposes that this pedestrian walkway be located on the outer or southern and western side of the driveway because it has the least steep grade and pedestrians would be more visible to the driver of a shuttle bus or the driver of a Refuge staff vehicle. The Refuge could also consider installing traffic signals that would only allow one vehicle to traverse the road at a time, but this would come at an additional installation and maintenance cost since it would involve purchasing, installing, and maintaining electronic systems.

These recommendations are only relevant if the Refuge can secure funding for these improvements in the future. There is currently no funding source available for this work.

Existing Constraints and Opportunities for Coordination to Improve Access to the Refuge and in the Community

Efforts to improve pedestrian and bicycle conditions in Kīlauea Town would support the goals of community stakeholders and the Refuge. Stakeholder interviews revealed that there is a perception that visitors to the Refuge often drive too fast along Kīlauea Road. There is also no bicycle or pedestrian access to the Refuge area though bicyclists and pedestrians do occasionally use the roadway to access it. There is a pathway that runs alongside Kīlauea Road for much of the length between the town and the Refuge but it is not in excellent condition, is narrow and does not connect to the Refuge directly. Construction of an improved pathway, enacting traffic calming measures on Kīlauea Road, and including bicycle and pedestrian facilities in all new transportation and land use development in town will help to reduce the pressure on Kīlauea's transportation network by providing an additional option for local trips, as well as improve safety for all users.

The Refuge developed its CCP at an opportune moment with regard to the planned implementation of improvements to pedestrian and bicycle access in and around Kīlauea Town. Within the last few years, the public's and developers' interest in making the North Shore of Kaua'i more multimodal has increased and the town is about to undergo some considerable changes in this regard. Below is a description of several of these planned and potential changes and improvements.

Kaua'i Path

The Kaua'i Path effort is the product of a non-governmental organization and is not an official program of Kaua'i County or the State of Hawai'i. However, the County supports planning for the development of a bicycle trail network throughout the island. Parts of this trail system have already been constructed with help from the Hawai'i Department of Transportation (HDOT), which has allowed trail segments within the highway right of way and has installed wide marked shoulders for safe bicycle travel on the south and east shores of the island. The Kaua'i Path organization released the *North Shore Path Alternatives Report* in January 2012. This report included several possible alternatives for constructing a path that would connect the communities along the North Shore, including Kīlauea Town and the KPNWR (Figure 36).

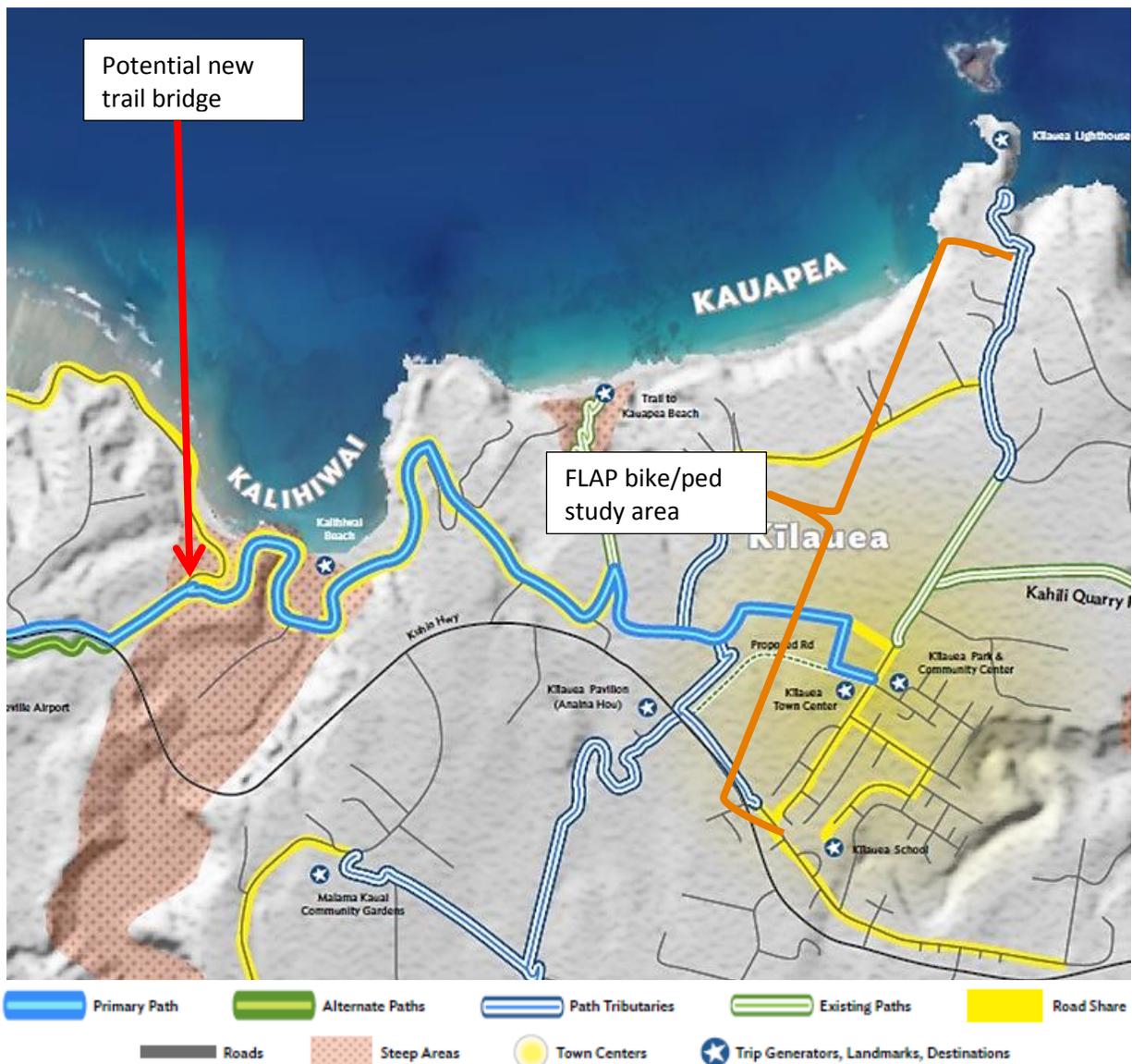


Figure 38: North Shore Path Alternatives Analysis, Kīlauea Section. SOURCE: *North Shore Path Alternatives Report*. (Points added for reference in this document)

The Alternatives Analysis recommends a primary path route through the Kīlauea plateau ending at the Town Center. It also includes the following recommendations of varying specificity:

- Extend and improve the existing path along Kīlauea Road from the town center 1.1 miles northward to the KPNWR and Lighthouse.
- Concurrent with the development of the proposed new entry road from Kūhiō Highway to the town center, implement traffic calming measures and improvements to Kīlauea Road and Kolo Road to make them more pedestrian and bicycle friendly.
- Work with private landowners to create a multi-use path connection between the northern boundary of the Kīlauea plateau property and the cul-de-sac at the end of Kauapea Road.
- Identify the existing dirt road to Kāhili Beach (a.k.a. Rock Quarry Beach) as part of the Kaua‘i Path system, through a shared road concept, which the Alternatives Analysis defines as a road that is shared by cyclists, pedestrians, and automobiles, and includes special signage and traffic calming treatments.

- Promote additional integrated paths for all future housing, wildlife Refuge, and commercial development projects.

New town access and bypass roads

If the planned 0.6 mile new town access road serving the new commercial development, Lighthouse Village, is built, it will likely include bicycle lanes or a multi-use trail per County requirements. If this road is constructed, the bicycle lanes or a trail would extend 0.6 miles from the intersection with Kūhiō Highway across from the Anaina Hou property to the road's intersection with Kīlauea Road at the Kīlauea Lighthouse Village. The County requirements for new roads also means that if a proposed bypass road connecting the new town access road to a point further north on Kīlauea Road is constructed, it would also likely include bicycle lanes, though this development only exists in concept at this time.

Upcoming commercial and community developments

Kīlauea Lighthouse Village broke ground in late 2016 and presents an opportunity to provide bicycle parking, install wayfinding and bicycle route signage along the bicycle routes, and connect to the existing off-street trail that runs alongside a portion of Kīlauea Road. Other proposed developments in town, such as a possible new residential area by the proposed bypass road that would only occur after such a road were constructed, and the Kīlauea Community Agriculture Center expected to be developed over the next few years provide opportunities for re-envisioning travel options for residents of the area as well.

As a major community partner in Kīlauea, the Refuge can support efforts to reduce motor vehicle traffic from local trips, since these new developments are likely to increase traffic in the vicinity of the Refuge. By providing bicycle parking, including bicycle and pedestrian trails and bike lanes, the new developments can offer an opportunity for local residents to access them without driving a car. The Refuge should be aware of these reasons to support the inclusion of facilities for pedestrians and bicyclists when offered the chance to provide input on plans and designs for new developments in town.

Potential Coordination with North Shore Path

The North Shore Path Alternatives Report was released in 2012. Since then, Kaua'i Path has worked to find funding partners and build community support to begin work on portions of the path. It appears that the first section to be implemented proximate to Kīlauea may be the portion on Kīlauea Road, which would mean building a new trail alongside the road and upgrading the existing trail. The Hawai'i Programming Decisions Committee awarded Kaua'i County a Federal Lands Access Program (FLAP) grant in 2015 for planning pedestrian and bicycle improvements on the 1.6 mile corridor from Kīlauea Point to Kūhiō Highway (Figure 36). This section is a part of the North Shore Path Alternatives Analysis Plan.

The Refuge should work closely with the County to ensure that the path is designed to have minimal to no impact on sensitive habitat, that it includes proper directional signage to the Refuge, and that it is coordinated with the input of the Refuge's local stakeholders. The County currently supports the development of this trail but it is still in the conceptual design phase so there is ample time to provide input on the location of trail connections and to help secure funding for the implementation of the trail project.

The award of the Federal FLAP grant to the County indicates a desire on the part of the County to provide safer pedestrian and bicycle travel along Kīlauea Road. The FLAP-funded study will include an initial design for the construction of a separated path and traffic calming measures along the road, as well as some planning for the reconfiguration of the Overlook. The FLAP grant is only to be used for planning purposes, so a funding source will need to be found in order to implement any recommended solutions from this planning study, but the study will give the Refuge a strong voice in the particulars of its design.

Potential future shuttle service to Kīlauea Point

The CCP selected alternative is for a shuttle service to eventually replace private vehicle access to KPNWR. Since this option may require a lot of moving pieces to come together to be realized, pedestrian and bicycle improvements such as bicycle parking at the Overlook should continue to be made in the short term regardless of any future changes that may affect access at the Point.

Provision of a shuttle service may provide an opportunity to significantly improve access to the Refuge by bicyclists and pedestrians so long as the shuttle hub location and overlook area has places for bicyclists to lock their bicycles and board a shuttle to visit the Refuge. Today, bicyclists and pedestrians are unable to visit the Refuge, but a future shuttle may change this. By requiring access by shuttle, the Refuge could allow pedestrians to walk to the Point along a five-foot walkway to be marked with paint or stencils on the outer curve of the driveway. The driveway will be able to accommodate this five-foot walkway because there will not be a need to provide enough driveway space for bi-directional traffic. The walkway line can also be marked with brightly colored flexible bollards, which should be spaced 30 feet apart from one another so as to allow the occasional vehicle to enter the pedestrian walkway when faced with an oncoming vehicle (Figure 37). Even with a mandatory shuttle, however, bicyclists should remain prohibited from entering the driveway due to the steep grade and tight, blind curve and should therefore park their bicycles at the Overlook and walk down or park at the hub location and take the shuttle bus.



Figure 39: Flexible bollards. Photo source: Bollards Queensland

Parking demand at shuttle sites will need to be identified prior to selecting the type and extent of bicycle parking, and will be influenced by the demand for bicycle parking for local uses as well as for Refuge visitors. The details of potential mid- and long-range shuttle service are discussed in the Shuttle Analysis chapter.

Recommendations for Kīlauea Road and in Kīlauea Town

The many new developments taking place in Kīlauea Town, in addition to the Refuge’s planning activities, present an opportunity to coordinate efforts to improve pedestrian and bicycle travel throughout the town. These developments will result in changes to the roadway infrastructure to accommodate new traffic, and this new infrastructure can be designed with pedestrians and bicyclists in mind.

Recommendation 1: Traffic calming on Kīlauea and Kolo Roads

Applying traffic calming on Kīlauea Road and Kolo Road would improve the quality of life in town because it would reduce speeding, improve safety, and make it more comfortable to walk or ride a bicycle. Specific treatments to apply to the road may be affected by the recommended designs from the FLAP-funded study by Kaua’i County. Traffic calming options on Kīlauea Road could include:

- Speed humps (Figure 38)
- Raised or textured pedestrian crossings (Figure 39)
- Neckdowns (curb extensions) at intersections (Figure 40)



Figure 40: Speed humps. SOURCE: www.pedbikeimages.org/Austin Brown and Dan Burden



Figure 41: Raised or textured pedestrian crossings. SOURCE: [www.pedbikeimages.org/ Dan Burden](http://www.pedbikeimages.org/Dan Burden)



Figure 42: Neckdowns at intersections. SOURCE: www.pedbikeimages.org/ Mitchell Austin and Dan Burden

Recommendation 2: Extend the bicycle trail to Kīlauea Point Overlook

The Refuge is supporting the Kaua‘i Path effort to rehabilitate and extend the existing trail alongside Kīlauea Road by participating in the FLAP-funded study. The Refuge can support efforts by the County to extend the trail as well as to calm traffic on the road by installing speed humps and bicycle parking in the Refuge section of the road at the Overlook. The path may increase the number of bicyclists who come to the Overlook; any changes to the re-design of the Overlook area will need to be mindful of the interaction between trail users and cars. The design should include a site plan that identifies the location of bike racks, pedestrian pathways, interpretive kiosks, motor vehicle travel lanes and clearly delineated parking spaces. In the vicinity of the Overlook, the bicycle/pedestrian trail should be raised high enough to minimize disruption to sensitive natural resources like nesting birds.

Recommendation 3: Improve the crosswalk of Kūhiō Highway

HDOT owns Kūhiō Highway, and this high-speed road is not particularly safe or comfortable for pedestrians or bicyclists to cross. The recently-constructed transit hub and community center at the Anaina Hou property, which is being considered as a Refuge shuttle parking site, needs a pedestrian crossing so that people arriving at the transit facility on foot or by bicycle can safely cross. There are a number of options that HDOT could consider. They include a pedestrian-actuated signal that turns red and then flashes yellow (High Intensity Activated CrossWalk Beacon or HAWK signal) with zebra stripe crosswalk (Figure 41) and a pedestrian refuge island (Figure 42)



Figure 43: HAWK signal (SOURCE: www.pedbikeimages.org/ Sree Gajula)



Figure 44: Pedestrian refuge island (SOURCE: www.pedbikeimages.org/ Dan Burden)

The County has also supported the concept of constructing a roundabout intersection design at this intersection after construction of the new town access road. The Refuge can join the County in supporting the improvement of the pedestrian crossing on this State-owned facility with either design (HAWK signal with refuge island or roundabout).

Jurisdiction of Facilities

The transportation facilities in the area are owned and operated by three jurisdictions. While all improvements for pedestrians and bicyclists could be undertaken together, each component part would need to be led by the jurisdiction with ownership of the facility. Coordination between the jurisdictions would, however, be beneficial because it could result in cost savings on construction projects and it would help ensure that any changes to the road infrastructure does not preclude improvements identified for the future. Along with the assistance of town stakeholders, the Refuge can act as a coordinator of these connected projects or as a supporting partner for those projects on facilities not owned by the USFWS. The recommended components for improving pedestrian and bicycle safety and comfort mentioned in this study are owned by the following jurisdictions:

- **The crosswalk on Kūhiō Highway and proposed roundabout at the Anaina Hou park-and-ride facility:** HDOT owns this road and controls planning and design decisions.
- **Kīlauea Road traffic calming:** Kauaʻi County owns most of this road and controls planning and design decisions. 0.2 miles at the end of the road leading to the overlook is owned by the FWS.
- **Kolo Road traffic calming:** Kauaʻi County owns this road and controls planning and design decisions.
- **Planned new town access road:** This road will be constructed with the Hunt development of Kīlauea Lighthouse Village. Kauaʻi County controls planning and design for the road.
- **Proposed Bypass road:** This proposed road would likely be constructed as part of any development in the Kīlauea Plateau area but, like the other roadways in the town, would likely be under the control of Kauaʻi County and subject to its design requirements.
- **Kīlauea Road Bicycle/Pedestrian Path rehabilitation and extension:** This path is owned by Kauaʻi County and is located in County right-of-way. Kauaʻi Path, a non-profit organization, is the local coordinator of planning for this effort, but the County is the ultimate owner of this project.

KNWRC will also need to be involved for detailed design of the extension of the trail on its property near and at the overlook.

- **Kīlauea Point Driveway and Parking Area:** The driveway to Kīlauea Point is entirely owned by the FWS.

Implementation Timeline

Immediate steps (within 3 years)

- Provide support to Kauaʻi County on the FLAP-funded Kīlauea Road pedestrian and bicycle access study (2015-2016) and align plans and designs with the post-CCP implementation planning, particularly with regard to access to the overlook.

Medium-term steps (3-6 years)

- Work with the County to secure funding for trail construction and traffic calming treatments on Kīlauea Road as recommended by the FLAP-funded study.
- Kauaʻi County plans to construct a new town access road to the Lighthouse Village development site. The Refuge should work with the County and HDOT to ensure that pedestrian and bicycle safety improvements are installed at the new town access intersection with Kūhiō Highway and the crossing of Kūhiō Highway to the existing transit station and community park. It is in the interest of the Refuge to improve safety in the event that this transit station is used as an access point for a future shuttle service, or for visitors who arrive by bus.
- Kauaʻi County’s proposed construction of the new town access road as part of the Hunt development is an opportunity to install neckdowns, wider sidewalks, and a marked crosswalk at Kīlauea Road. Design for this intersection ought to consider the potential for a future “hop-on, hop-off” bus stop at this location in the Kīlauea Town Center. The Hunt development should include bicycle parking once it is constructed.
- The Refuge can install bicycle parking and include wayfinding signage for bicyclists and pedestrians to a potential new pilot shuttle hub location.
- The Refuge can install bicycle parking at the Overlook and employ traffic calming techniques like speed humps, along with other improvements identified by the Refuge such as expanding formal parking spaces and providing a Nēnē corridor. These improvements will be detailed in the FLAP-funded design study.
- Support efforts by the County for planning to connect Kīlauea area multi-use path with North Shore path connections to Princeville and Hanalei.
- Once the Refuge is ready to implement a mandatory shuttle service, stripe the Refuge driveway to create a five foot walkway on the outer curve of the driveway from the gate to the fee booth area and install flexible bollards spaced 30 feet apart to clearly mark the pedestrian space.

Long-term steps (6+ years)

- Construct recommended trail and traffic calming features on Kīlauea Road from the FLAP-funded study
- Support construction of North Shore Path extension to destinations west of Kīlauea town

Install Refuge driveway hardscape treatments (chicanes, textured pavement, etc.) when the driveway is due for replacement. While pedestrian use may still be discouraged if there is no shuttle, such treatments would improve the safety of pedestrians who do use the driveway as this would slow traffic. There is no funding or a specific plan developed for replacement of the driveway so this option is more conceptual and can be considered at a future date.

Chapter 7: Signage



Introduction

Transportation-related signs enhance visitor wayfinding and provide clear and comprehensible destination information. Each of the three Refuges in the Kaua'i National Wildlife Refuge Complex (KNWRC) presents unique signage challenges and opportunities. With input gathered from Refuge staff, transportation stakeholders, and community leaders, this Signage Chapter seeks to synthesize identified challenges and opportunities into actionable items for implementation by KPNWR, Kaua'i County, and the Hawai'i Department of Transportation (HDOT).

The purpose of this Signage Chapter is to provide KNWRC with an effective way forward to meet the Refuge's, community members', and visitors' transportation wayfinding and informational needs. Effective signage increases traveler confidence while fostering greater appreciation and understanding of the Refuge. This creates a safer and more enjoyable experience for Refuge visitors while ensuring that traffic going to and from the Refuge is traveling on appropriate routes identified by Refuge, town, and county stakeholders.

The Sign Plan included in this chapter is not a traditional sign plan, many of the recommendations included can be adapted into a more comprehensive sign plan that addresses other signage goals such as interpretation and law enforcement. The Sign Plan at the end of this chapter focuses on existing wayfinding and informational signs that are likely to be changed in the short- and medium-term. This chapter seeks to improve the visitor experience at the three sites managed by KNWRC. As the only Refuge in the Refuge Complex open to the public and with significant transportation changes coming in the near-term, KPNWR requires the most in-depth way finding and traveler information analysis and therefore much of this chapter focuses on KPNWR signage needs.

Recommendations

This section summarizes the recommendations for adding, updating or replacing signs for access to the Point at the KPNWR as well as the Hanalei Overlook. The recommendations for signage related to the Point are appropriate for the existing and future conditions of the Complex, as they relate to all of the short-term shuttle recommendations detailed in the Shuttle Analysis chapter. There are several potential developments that may change these circumstances and will require modifying or adding new signage recommendations. Refuge staff will want to consider the following recommendations as it implements its phased approach:

- Replace all current directional signage with official FWS signage with brown background (as described in the tables below).
- Utilize MUTCD-approved symbols to indicate activities and services.
- Ensure sign consistency from primary corridor (Kūhiō Highway) to KPNWR.
- Consider alternatives to Dynamic Message Signs (DMS) with other traveler information technologies (Access Management Chapter 6).
- When developing signage for the Refuge today, consider implementation implications of future changes to the Refuge transportation system.

The following timeline presents a phased approach to sign installation and assumes the implementation of a mandatory shuttle service in the short-term, as discussed as Plan A in the Shuttle Analysis Section (Chapter 7). Each sign needs to be thoroughly analyzed with regard to message, location, design, environment, and purpose.

Short-term (0-3 years)

With the Community Agriculture Center selected as the initial stop for the KPNWR mandatory shuttle, signage should be installed to let visitors know where to turn for shuttle access. The messaging on the shuttle signs should be coordinated between the Refuge, Community Agriculture Center, County, and shuttle operator to ensure the right information is provided. If the shuttle is not implemented in the short-term, then the shuttle signage recommendations should be implemented during the appropriate time.

The following are the short-term signage recommendations for the KNWRC and its partners to implement immediately:

- Work with the County, shuttle contractor, and Community Agriculture Center to design and install shuttle stop signage (1f).
- Work with HDOT to update Kūhiō Highway signs (1a, 1b)
- Work with the County to submit request for updated signs along Kīlauea Road (1c, 1d and 1e); the County and Refuge staff will need to agree on payment and manufacturing responsibilities. If funding is available and the County grants its approval, replace signs located on Kīlauea Road (1c, 1d and 1e); these signs will be useful to nonmotorized visitors and therefore should be highest priority replacement for KPNWR of existing signs.
- If the Refuge, County, and HDOT agree that the investment is worth updating the Hanalei Overlook signs prior to the completion of the new Hanalei Valley Viewpoint, which is estimated to be in two or more years, then the signs should be updated (2a, 2b, 2c, 2d).
- If the Refuge chooses to run the shuttle from Lighthouse Village instead of/or in addition to the Community Agriculture Center, the Refuge should work with the County to put a directional sign in the location of 1e. The Refuge would also need to gain permission from the owner of Lighthouse Village to place a sign at the shuttle pickup location indicating the bus stop.

Medium-term (3-6 years)

In the medium term, the Refuge and its shuttle partners can assess how the signs can be enhanced and what additional signs may be necessary if the shuttle service is expanded. The Refuge, County, and shuttle operator should evaluate effectiveness of signage in directing visitors to the shuttle service staging location. If additional shuttle stops are added, as recommended in the Shuttle Analysis Section, signage needs for those stops should also be included in those discussions.

Long-term (6+ years)

In the long-term, signage needs should be continually evaluated; the Refuge, County, and shuttle operator should speak with community members about the effectiveness of signage and recommendations for improvements, if necessary. It is assumed that any necessary signage for the new Hanalei Valley Viewpoint will be addressed during the planning and design process.

No Shuttle Variation

If a shuttle does not work or is not implemented, and instead the congestion management strategies in the Access Management Section (Chapter 6) are used, the Refuge should consider the following recommendations for signage:

- Work with HDOT to update Kūhiō Highway signs (1a, 1b)
- Work with the County to submit request for updated signs along Kīlauea Road (1c, 1d and 1e); the County and Refuge staff will need to agree on payment and manufacturing responsibilities.

If funding is available and the County grants its approval, replace signs located on Kīlauea Road (1c, 1d and 1e); these signs will be useful to nonmotorized visitors and therefore should be highest priority replacement for KPNWR of existing signs.

Signage Considerations

Multiple considerations will shape future signage needs for KNWRC. The following considerations are important for transportation planning and will remain relevant throughout implementation of the CCP and operations for years to come.

Future transportation changes

As a growing island community and tourist destination, future developments on Kauaʻi will affect KNWRC. The signage recommendations are based on the existing conditions of the Refuge but should be adapted depending on how future developments affect the all the Refuges in the Kauaʻi National Wildlife Refuge Complex and the surrounding areas. For example, an important future development is the possible establishment of a transit service connection to KPNWR. This service would reduce the need for wayfinding information as most or all visitors would be taken to the Refuge via shuttle. The signs installed would need to direct visitors to the transit hub rather than to the Refuge.

Additionally, discussion of the relocation of Hanalei Viewpoint would require additional and different signage. This Viewpoint would replace the current one and have a larger parking lot to accommodate more visitors. If these plans do move forward, Refuge staff must determine if changing and adding signs to the current scenic overlook is necessary. These considerations will be analyzed in a supplemental Environmental Assessment.

A phased, piece-meal implementation approach to this Sign Plan may best suit the current and future Refuge's needs rather than a full signage system replacement. There may be some signs that can be updated without considering the timing of potential transportation changes. Additionally, there may be signs that are a high priority for the complex that should be addressed more immediately than others despite potential transportation changes. Refuge staff will need to decide what level of investment is necessary to improve current signage conditions while still keeping in mind changes in visitor travel patterns and access modes.

Need for signs

This section describes four overarching signage needs for KNWRC: Refuge identification, wayfinding, safety, and Refuge information.

Refuge identification

Many of the highway and road signs surrounding KPNWR direct motorists to the Kīlauea Lighthouse. None of the existing signs refer to a National Wildlife Refuge (NWR) or U.S. Fish and Wildlife Service (USFWS). Furthermore, the directional signs are green, despite the fact that brown signs are a national standard for federal public lands and cultural destinations. Without the appropriate NWR branding, visitors may not understand that the lighthouse is situated within a NWR, and that the primary mission of KPNWR is to protect wildlife.

Wayfinding

Wayfinding refers to a traveler's ability to easily find his or her way without getting lost. A strong wayfinding system uses signs (and other materials, when appropriate) to promote traveler confidence and direct visitors to routes and destinations that are best suited or are designed to accommodate the traffic and visitors in general.

Wayfinding systems can be oriented to many different user groups, but the Sign Plan presented in this chapter focuses on motorists. Effective wayfinding ensures that signs support a motorist from the main or first-level corridor (Kūhiō Highway for KPNWR) all the way to the destination. Second-, third-, and fourth-level signs that supplement the original message on the main travel corridor are frequently called supplemental signs by highway agencies.

Wayfinding relies on consistency of design and messaging to minimize confusion. For example, if a brown sign on Kūhiō Highway directs motorists to “Kīlauea Point National Wildlife Refuge”, it is important that all supplemental signs are brown and direct motorists to “Kīlauea Point National Wildlife Refuge” or perhaps “Kīlauea Point NWR.” It would be confusing if any of the supplemental signs changed color, design, and/or pointed travelers to a destination with a different name. It should not be assumed that visitors know that the Lighthouse is situated within the Refuge. Therefore, while wording can be simplified, abbreviated, and supplemented by familiar symbols, it is important that the overall message remains consistent.

If the destination for drivers continues to be the Refuge, all signs can still direct drivers to the Refuge itself. Once a shuttle system is in place, directional signs should be to the Refuge shuttle off-site hub.

Safety

Within Kīlauea Town and between the town and KPNWR, community leaders identified speeding as a major problem on Kīlauea Road despite the presence of several speed limit signs along the road. Speeding and careless driving are two barriers to safe bicycling and walking along Kīlauea Road. Improved signage can address some safety concerns by encouraging motorists to be wary of pedestrians, share the road with bicyclists, and watch out for wildlife. Safety is also a concern on the Refuge driveway, which is currently too steep, narrow, and congested to allow for multimodal access. As a result, KPNWR only allows access to motorized vehicles. Yet despite the presence of several different signs, pedestrians and bicyclists sometimes attempt to travel the driveway. Additionally, there are safety concerns surrounding vehicle-wildlife interactions near the Refuge entrance. A wildlife corridor or crossing as well as an entrance road re-design is being considered to reduce negative human and Nēnē interaction at the Overlook and Refuge entrance road. Additional signage will be necessary if a redesign occurs to ensure motorized and nonmotorized interactions are limited with the Nēnē.

Another safety issue faced by KPNWR is ingress and egress for the Hanalei overlook (Figure 30). Located along Kūhiō Highway, the overlook can be difficult to access when traffic is heavy along Kūhiō Highway. In addition to needed safety improvements at the Hanalei Overlook, signs are needed to notify motorists of the upcoming point of interest and warn drivers of exiting vehicles. Currently, there are neither turn lanes nor traffic signals.



Figure 45: Hanalei Overlook pull-off on Kūhiō Highway

Refuge information

At KPNWR, multiple signs exist to explain Refuge information to visitors: at the Overlook, along the Refuge driveway, within the parking area, and near the entrance fee booth. These signs help to reinforce safety considerations discussed above, and they also provide basic information such as Refuge hours, admission fees, and other access information. There may be opportunities to consolidate Refuge information at the Kīlauea Point Overlook as sign clutter can be detrimental to the overall beauty of the site and deter visitors from understanding the messages being communicated.

Hanalei NWR faces a different challenge as it relates to visitor information because the interior of the Refuge itself is not open to the public. As a result, KNWRC does not want to overly promote the Refuge via signage along Kūhiō Highway. At the same time, the Hanalei Overlook does offer motorists an opportunity to pull off, park, and enjoy a view of the taro fields and the Hanalei River valley.

Sign guidelines and standards

Despite the presence of unregulated signs throughout Kauaʻi, all new signs (especially those in support of federal installations) should adhere to jurisdictional guidelines. It is important that KNWRC staff work with HDOT and the County of Kauaʻi on all signage for state and county roads. Additionally, the Refuge should follow FWS signs standards to be cohesive with the rest of the NWR System. The following rules and regulations currently guide the wording, size, and location of each recommended sign:

- U.S. Department of Transportation – Manual on Uniform Traffic Control Devices (MUTCD) 2013
- U.S. Fish and Wildlife Service Sign Manual 2004
- Kauaʻi County Signage Regulations

Cultural relevance and island atmosphere

Several stakeholders feel that all signs should align with the Hawaiʻian culture and Kauaʻi's culture in particular. Several signs, including the Kīlauea Town entrance sign and the island-wide moku signs, were recommended for the project team to explore as options for new sign designs. An example of the moku

sign is shown below (Figure 31). Moku signs were installed as part of a cultural and historical project to display the traditional names of the different parts of Kauaʻi. Both the Town entrance and moku signs reflect the island’s culture while also being informative to travelers.

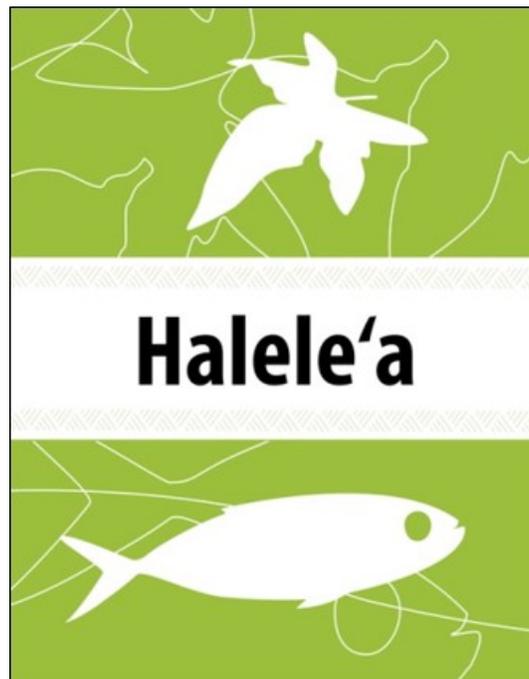


Figure 46 Example of a moku sign. Source: <http://www.kauainuikuapapa.com/kauai-sign-project/>

The project team feels that though the Kīlauea Town entrance sign and the island-wide moku signs look attractive and are important for establishing a stronger sense of place, however they are not appropriate for highway or roadway directional signage. Motorists, particularly visitors, are familiar with national standards for road signs, and official messages and symbols inspire confidence among visitors. Therefore, the project team recommends the use of FWS and MUTCD-approved symbols, typology, and colors. The FWS staff may explore more culturally relevant symbols or signs for signage located on the Refuge’s right-of-way.

Dynamic messaging signs (DMS) were also discussed during stakeholder meetings. For both aesthetic and maintenance reasons, DMS is not preferred as permanent signage for the Refuge. DMS is still discussed in the Access Management Section (Chapter 6) as those types of signs could play a role in parking lot management and spreading traveler information.

Sign Plan

This section discusses the existing signs and suggested replacement signs for KPNWR and Hanalei NWR. Hulēʻia NWR does not have any road signs, and none are recommended for installation in the near future. It is important to note that this is not a traditional sign plan, but rather presents the Refuge staff with wayfinding and traveler information sign options they can choose to implement in the short-, medium-, and long-term. All recommended signs developed in this chapter are consistent with MUTCD regulations and the USFWS’s Sign Manual. The selection of signage to implement is highly dependent on funding availability, staff availability, and future access management strategies.

KPNWR sign inventory and recommendations

Figure 32 shows the location of existing signs leading to KPNWR. The following tables each show a picture of and describe the existing signs and suggest replacement or additional signs and changes in that location, if necessary. The numbers on the map (1a to 1g) correspond to the numbers in the headings of the tables. The dotted line represents the Community Agriculture Center's proposed entrance and parking area (for more details see the Shuttle Analysis Section, Chapter 7).

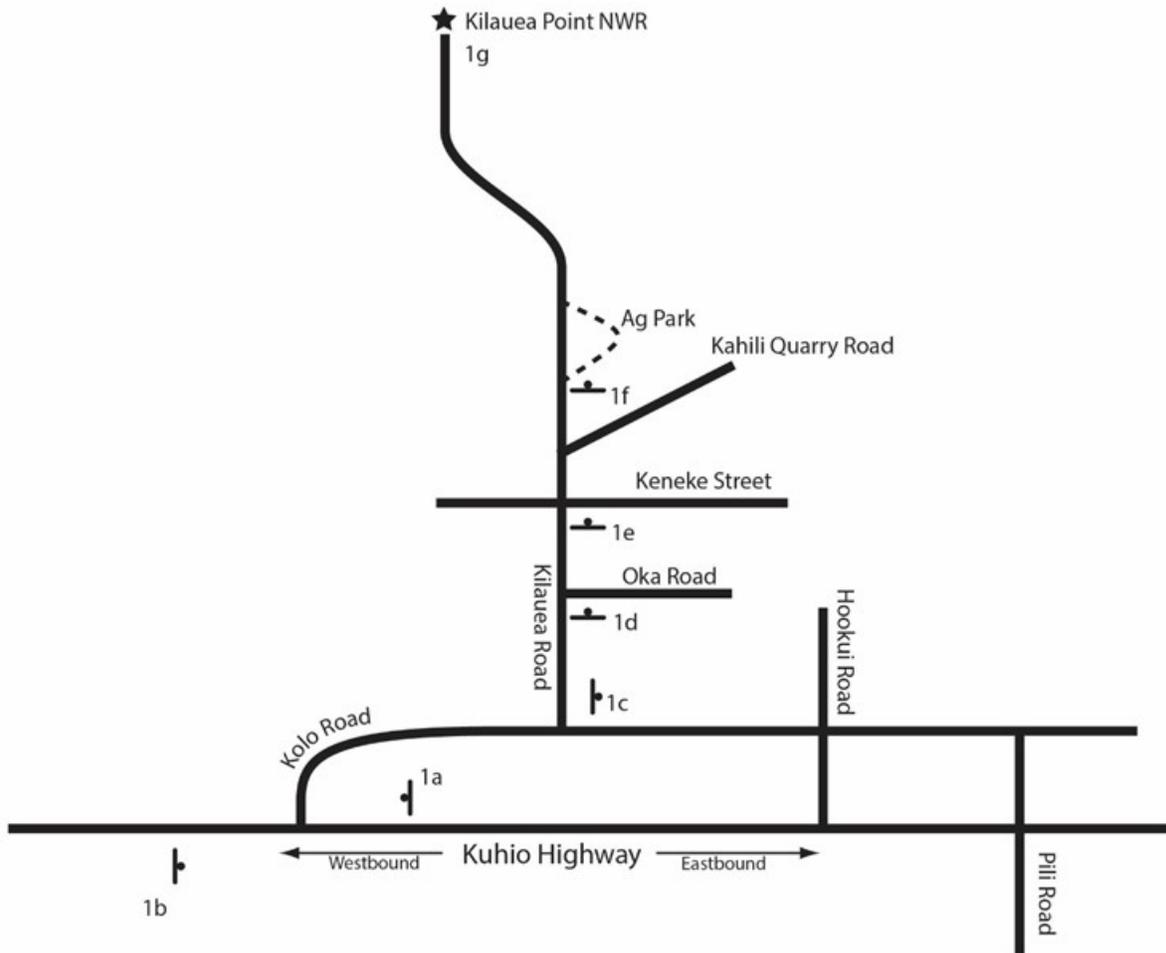
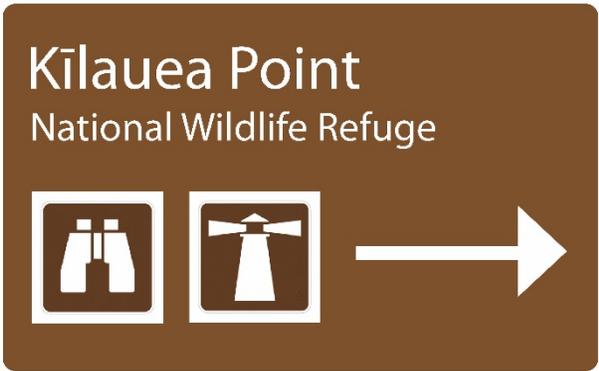


Figure 47: Sign Inventory map for KPNWR (not to scale). Source: Volpe Center

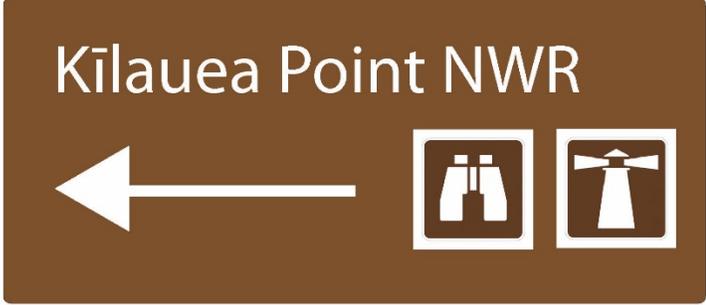
1a. Kūhiō Highway Westbound

Existing Sign		New Additional Sign	
			
Location	Prior to intersection of Kūhiō Highway Westbound and Kolo Road; 2.2 miles from Refuge (HDOT right-of-way)		
Description	Large, green sign with right arrow to “KĪLAUEA LIGHTHOUSE”, in addition to direction/distance to Hanalei		
Condition	Fair		
Recommendations	<ul style="list-style-type: none"> - Remove “LIGHTHOUSE” from existing sign (sign would then refer only to the town) - Approximately 100 yards before existing sign, add new sign structure with official FWS sign, “Kīlauea Point National Wildlife Refuge” with right arrow. Include on sign MUTCD symbol for lighthouse and wildlife viewing and/or add FWS logo to sign. 		

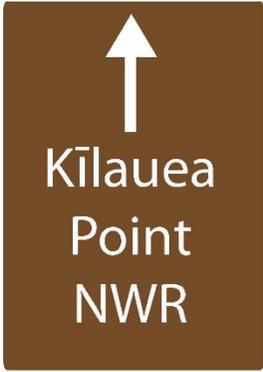
1b. Kūhiō Highway Eastbound

Existing Sign		New Additional Sign
		
Location	Prior to intersection of Kūhiō Highway Eastbound and Kolo Road; 2.2 miles from Refuge (HDOT right-of-way)	
Description	Large, green sign with left arrow to “KĪLAUEA LIGHTHOUSE”, in addition to direction/distance to KAPA’A and LĪHU’E	
Condition	Fair	
Recommendations	<ul style="list-style-type: none"> - Remove “LIGHTHOUSE” from existing sign (sign would then point to the town) - Approximately 100 yards before existing sign, add new sign structure with official FWS sign, “Kīlauea Point National Wildlife Refuge” with left arrow. Include on sign MUTCD symbol for lighthouse and wildlife viewing and/or add FWS logo to sign. 	

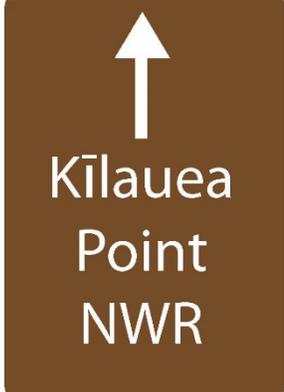
1c. First Supplemental Sign

Existing Sign		New Replacement Sign
		
Location	Kolo Road and Kīlauea Road intersection; 1.9 miles from Refuge (County right-of-way)	
Description	Small green hanging sign; difficult to see from road	
Condition	Fair	
Recommendations	<ul style="list-style-type: none"> - Replace with larger, brown supplemental sign to “Kīlauea Point NWR” - Sign should be mounted directly to the existing sign pole structure 	

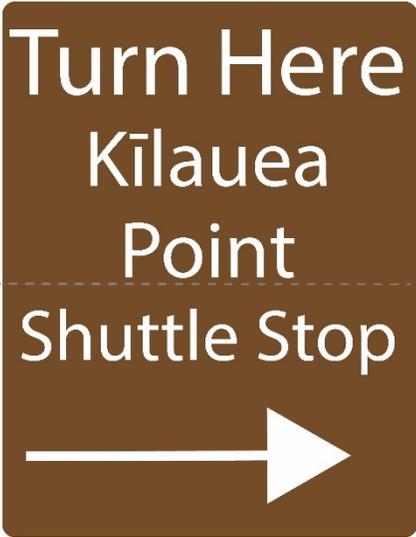
1d. Second Supplemental Sign

Existing Sign		New Replacement Sign
		
Location	Kīlauea Road and Oka Street intersection; 1.6 miles from Refuge (County right-of-way)	
Description	Small green sign that says “Kīlauea Lighthouse” with small arrow	
Condition	Good	
Recommendation	Replace green sign with brown sign	

1e. Third Supplemental Sign

Existing Sign		New Replacement Sign
		
Location	Kīlauea Road and Keneke Street intersection; 1.5 miles from Refuge (County right-of-way)	
Description	Small green sign that says “Kīlauea Lighthouse”	
Condition	Fair	
Recommendation	Replace green sign with new brown sign	

1f. New Sign – Refuge Shuttle Turn Here

New Sign – Example Panel Flip	Example Panel Flip
 <p>Source: www.seton.com/easy-flip-parking-lot-signs-98019.html</p>	<p>Side 1:</p>  <p>Side 2:</p> 
Location	Kīlauea Road and Community Agriculture Center entrance intersection; 1.2 miles from Refuge (County right-of-way), and Lighthouse Village Parking Lot if Shuttle stop is added there.
Description	No sign currently exists as the entrance to the Community Agriculture Center is under construction starting in 2016.
Condition	N/A
Recommendation	Add changeable message sign that can be adjusted when the Refuge is open and the shuttle is in operation; example provided here is a panel flip signs, although there are others that the Community Agriculture Center may choose to pursue.

1g. Refuge Entrance Sign

Existing Sign		New Replacement Sign	
		Already Updated; Add "Shuttle Access Only" Sign below	
Location	Entrance to Refuge at scenic overlook, end of Kīlauea Road		
Description	Small green sign that says "Kīlauea Lighthouse"		
Condition	Fair		
Recommendation	Replace green sign with official Refuge entrance sign - completed		

Hanalei NWR sign inventory and recommendations

Figure 33 inventories the wayfinding signs for Hanalei NWR’s overlook. The recommendations provided below should weigh the possibilities of the relocation of the Hanalei Overlook. If the Overlook is relocated, then these signs may need to be moved accordingly. All of Hanalei’s signs are on HDOT right-of-way, meaning the Refuge staff should work closely with HDOT if they would like to update and replace any signs.

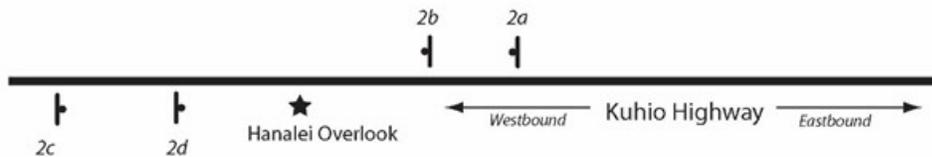


Figure 48 Sign Inventory map for Hanalei NWR (not to scale). Source: Volpe Center

2a. Advanced Notice Hanalei Scenic Overlook Westbound	
Existing Sign	New or Updated Sign
	
Location	1,000 feet prior to the overlook opening (HDOT right-of-way)
Size	Medium
Condition	Good
Recommendation	<ul style="list-style-type: none"> - Replace with official Refuge color, "Hanalei Overlook 1000 FT" - Incorporate the official binocular symbol to identify the overlook as a watchable wildlife location²⁴

2b. Hanalei Scenic Overlook Westbound	
Existing Sign	New or Updated Sign
	
Location	20 feet prior to the overlook opening (HDOT right-of-way)
Size	Medium
Condition	Good
Recommendation	<ul style="list-style-type: none"> - Replace with official Refuge color, "Hanalei Scenic Overlook" - Incorporate the official binocular symbol to identify the overlook as a watchable wildlife location²⁵

²⁴ As recommended in the Hanalei and Hulē'ia NWRs draft CCP, Goal 4, Objective 4.1: Improve Refuge information and orientation

²⁵ As recommended in the Hanalei and Hulē'ia NWRs draft CCP, Goal 4, Objective 4.1: Improve Refuge information and orientation

2c. Advanced Notice Hanalei Scenic Overlook Eastbound	
Existing Sign	New or Updated Sign
	
Location	1,000 feet prior to the overlook opening (HDOT right-of-way)
Size	Medium
Condition	Good
Recommendation	<ul style="list-style-type: none"> - Replace with official Refuge color, "Hanalei Overlook 1000 FT" - Incorporate the official binocular symbol to identify the overlook as a watchable wildlife location²⁶

2d. Hanalei Scenic Overlook Highway Sign (Southbound)	
Existing Sign	New or Updated Sign
	
Location	20 feet prior to the overlook opening (HDOT right-of-way)
Size	Medium
Condition	Good
Recommendation	<ul style="list-style-type: none"> - Replace with official Refuge color, "Hanalei Scenic Overlook"

²⁶ As recommended in the Hanalei and Hulē'ia NWRs draft CCP, Goal 4, Objective 4.1: Improve Refuge information and orientation

- | | |
|--|---|
| | - Incorporate the official binocular symbol to identify the overlook as a watchable wildlife location ²⁷ |
|--|---|

Conclusion

This Signage Section outlines signage considerations, needs, and recommendations for the Refuge. For each of the signs recommended here, the Refuge will need to work closely with its partners, the County, HDOT, and potential shuttle service provider to develop the new signs. This evaluation of wayfinding signage for the Refuge should provide a basis for updates that can be made under the Complex's current transportation system as well as with any potential future changes.

Chapter References

1. FWS Sign Plan examples: http://catalog.data.gov/group/fws-gov?q=sign+plan&sort=none&metadata_type=non-geospatial
2. <http://mutcd.fhwa.dot.gov>
3. USFWS Roadway Design Guidelines 2012
4. http://www.fws.gov/policy/signManual_LowRes.pdf
5. [Summary of Outdoor Signs, County of Kauai](#)

²⁷ As recommended in the Hanalei and Hulē'ia NWRs draft CCP, Goal 5, Objective 5.1: Improve Refuge information and orientation

Appendix A: Transportation Recreational Opportunity Spectrum

Overview

The Transportation Recreational Opportunity Spectrum (TROS) is a way to examine recreational travel opportunities using GIS and a systematic scoring method to rate current and desired conditions for recreation sites and areas. The TROS was developed by FHWA with help from USGS and the University of Vermont. The primary goal for TROS is to help land use and recreation managers more objectively compare current and desired transportation conditions of their recreation areas. TROS also helps compare varying recreation sites so that managers can make decisions about the overall transportation flow in their areas.

Settings and Locations

Settings in TROS are very similar to the US Forest Service's ROS. Settings in TROS are more generalized, and range from Urban to Primitive. The definitions of the settings are based in what kind of recreational opportunities one would expect to find there. For example, in an urban setting one would tend to find manicured and built up recreation, such as city parks and malls. In a natural setting one would find paved roads and built infrastructure, but the surroundings would be natural – forests or deserts. In a primitive setting, no man-made structures exist.

Locations in TROS are represented by the recreation sites. Locations can be anything where transportation tends to congregate – most typically it is a site that is accessible by vehicular traffic and includes a parking lot. Locations range from large high developed sites to more primitive unpaved sites. Locations can be scored based on five indicators: Density, Facilities, Attractiveness, Mobility, and Accessibility.

TROS Indicators

Density: The transportation density of a Location based on the capacity (often parking spaces) of the location and how much peak-day traffic it sees. A desirable density would be just under the capacity of the Location. Densities that are too high (overcrowding), or too low (overbuilt) are not desirable.

Facilities: The condition of the facilities at the Location.

Attractiveness: The relative attractiveness of the Location in comparison to other Locations or in relation to its setting. A high attractiveness score means that many people want to visit it.

Mobility: The number and rating of the four modes of travel (auto, pedestrian, bicycle, transit) that can be used to access the Location. The highest score means all four modes can access this site safely and easily.

Accessibility: Accessibility of a Location is measured in time, cost, and distance. The distance of a Location from its population source usually increases the time and cost it takes to visit it. A high accessibility score means that the time, cost, and distance of a Location is relatively small.

Current and Desired Conditions

Conditions are based on the scoring of each indicator for both the current and desired use of the Location. For example, if a manager observed that a Location was overcrowded, she could set the current Density score low based on empirical data. The desired density score would be raised, and then a prescription created for the way to raise that score – perhaps by adding more parking spaces,

restricting access, or improving another Location to get more visitors to go there. By creating the prescription, the desired scores for the other indicators would be raised or lowered.

TROS and the Regional Study

For this regional study, a TROS was built for the entire island of Kaua'i. Settings were created using imagery. Destination sites were created in GIS as the Locations. The average distance to visitor populations was created separately, but scored as Accessibility for each Location. The TROS Data that has been created for this study is available from FHWA for use by any agency involved with Kaua'i, and we welcome its use and expansion.

Appendix B: Distances to Destination Sites Model

Overview

In order to look at transportation on Kaua'i from a visitor perspective, it was important to create an accessibility model that showed the unique challenges visitors face when travelling around the island. The GIS team at CFLHD created this distance model using a unique piece of data that is typically unavailable in any other state: hotel room inventory. The Hawai'i Department of Business, Economic Development, and Tourism keeps a record of every hotel and individual vacation unit, and how many hotel rooms each unit has – it is called the Visitor Plant Inventory. Using this data, it was possible to create a visitor population in a geographic context – where the visitors actually stay. This isn't a strict population, but more of a travelling population. The assumption is that every party that stays in one hotel room has one vehicle. On average and taking occupancy rates into account, this is probably a pretty close approximation to the actual visitor travelling population. Without occupancy rate data, this model assumes a 100% occupancy rate.

Hotel Zones

The Visitor Plant Survey splits the data into distinct sub-areas on the island. By looking at which hotels were in each area, it was possible to create hotel zones. These zones tend to be relatively small and not necessarily located where the residents of the island live. For example, the most populous hotel zone is Po'ipū, comprising 37% of all hotel rooms on the island, while only 17% of the population lives there. Figure 12 shows the map of the hotel zones as derived from the Visitor Plant Survey. In order to derive distances to sites from these hotel zones, centralized nodes were created to represent each zone. They were selected for their proximity to most of the hotels in their zone, and for their location along one of the major corridors in or out of each zone.

Distances to Destination Sites

The next step was to find the distances from the destination sites to each one of the nodes representing hotel zones. A sample of the table is below:

Name	D_Waimea	D_Po'ipū	D_Līhu'e	D_Wailua	D_Hanalei
Kīlauea Point NWR	37	37	26	18	7
Waimea Town	10	18	22	29	51
Waimea Canyon	21	29	33	40	62
Pu'u Hinahina	25	33	47	44	66
Kalalau Lookout	29	37	51	48	70
Hanapēpē Town	4	12	16	23	45
Port Allen	4	12	16	23	45
Spouting Horn	9	3	13	20	42
Kilohana Plantation	11	11	1	8	30
Nāwiliwili Town	14	14	1	8	30
Wailua Falls	17	17	6	9	31
Wailua Marina	18	18	7	1	23
Opaeka'a Falls	20	20	9	2	24
Kapa'a Town	21	21	10	2	20
Hanalei Overlook	40	40	29	22	0
Hanalei Town	43	43	32	24	3
Maniniholo	49	49	38	31	9

Kalalau Trailhead	50	50	39	32	10
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The unique linear nature of the road network in Kaua'i meant that for nearly every destination site, there was only one way to get there – it was either 'upstream' towards Hanalei, or 'downstream' towards Waimea. In the case that there were multiple ways to get to a destination, the one with the lowest distance was chosen.

Visitor Populations

Based on the Visitor Plant Survey, the following are the populations of each hotel zone:

Hotel Zone	Total Rooms	Multi-Unit Rooms
Kalaheo / Waimea	173	154
Po'ipū	2972	2869
Līhu'e	1205	1201
Wailua / Kapa'a	1907	1869
Hanalei / Princeville	1649	1452

Math

For each destination site, the distance to each hotel zone was then multiplied by the population of that hotel zone. Think of this as the one way vehicle miles travelled if everyone in that hotel zone visited that site. Those numbers are then added together and divided by the total hotel room population (7,906) to come up with an average distance. Here is the example of Kīlauea Point NWR:

Kalaheo / Waimea: 37 (miles) * 173 (rooms) = 6401

Po'ipū: 37 * 2972 = 109,964

Līhu'e: 26 * 1205 = 31,330

Wailua / Kapa'a: 18 * 1907 = 34,326

Hanalei / Princeville: 7 * 1649 = 11,543

$(6,401+109,964+31,330+34,326+11,543)/7,906 = 24.48$ average miles

Average Distances to Destination Sites

Using the above method, here are the average distances to the most popular destination sites:

Name	Avg_Mi
Kīlauea Point NWR	24
Waimea Town	28
Waimea Canyon	39
Pu'u Hinahina	44
Kalalau Lookout	48
Hanapēpē Town	22
Port Allen	22
Spouting Horn	17
Kilohana Plantation	13
Nāwiliwili Town	14
Wailua Falls	16
Wailua Marina	13

Name	Avg_Mi
Opaeka'a Falls	15
Kapa'a Town	15
Hanalei Overlook	26
Hanalei Town	28
Maninihola	35
Kalalau Trailhead	36
Po'ipū Beach	15
Hanalei Pavilion	28

Appendix C: Scope of Work Outline for Contractor to Conduct Reservation System Implementation Analysis

Example Statement of General Objectives and Scope for a Reservation System Design and Implementation Study

1.0 Background

- 1.1. Insert relevant information about USFWS and Kaua'i National Wildlife Refuge and Kīlauea Point Background. Include overview information of visitation patterns, concerns or impacts, what previous studies said, and what USFWS wants to accomplish with a reservation system.
- 1.2. This document identifies the scope of work, tasks, deliverables, phases of project development, related knowledge and experience requirements, materials to be provided by the Government, an outline of the task schedule, the Contractor's responsibilities, payment requirements for the design and recommendations of vehicle and visitor management at Kīlauea Point.

2.0 Objectives

- 2.1 The objective of this project is to meet the immediate need of designing a reservation system which would assist USFWS in management in dealing with the increasing level of visitation to the site each year. Implementation of the system would be immediate and must be sustainable for the long-term. The project must provide options within funding constraints to manage vehicles entrances into the site and spread visitation more evenly throughout days and times.
- 2.2 The USFWS desired outcome is to protect station resources, alleviate congestion, alleviate pressure on USFWS station, as well as provide for visitor access within the existing sites transportation infrastructure, including the Overlook and the Point.
- 2.3 This project must build off of past documents and workshops that have focused on the site's transportation and congestion management problems and enable USFWS to address the previously stated issues and concerns by implementing non-shuttle transportation recommendations for vehicle access. As such, the project must consider the financial feasibility of implementing a reservation system and include an evaluation of funding for each option to capitalize and maintain the system.
- 2.4 The recommended options should be presented and analyzed in accordance with USFWS policies and laws and as determined by the Contracting Officer.
- 2.5 Unless otherwise stated the Contractor shall provide all equipment, material, personnel and expertise to properly carry out the objective of this contract.

3.0 Time Frame/Period of Performance/Location

- 3.1 Time Frame: The period of performance is not expected to exceed 250 days. As this work is not severable, the work is deliverables based; the Contractor shall manage the work efficiently and

effectively, in partnership with the Government team.

3.2 Location: Upon receiving access to the Government plans, reports and studies, most work may be performed at a remote location. Some onsite work/face to face meeting are required in performance of this contract.

4.0 Scope

- 4.1 This is a Non-personal, Commercial Type, Time and Materials/Labor Hours Contract. Although Contractor responsibilities include all requirements described in this SOO, two key Contractor areas of responsibility require the provision of subject matter expertise and technical assistance to USFWS regarding how to efficiently meet the objective of the contract.
- 4.2 The Contracting Officer is the only person authorized to sign contracts (within his/her respective warrant authority), and modify the Contract. Other duties of the Contracting Officer, and any delegable duties, will be identified in writing at the Post Award Conference along with any limitations on those delegated duties. A Contracting Officer's Representative (COR) will be identified prior to performance.
- 4.3. As part of the scope of this Contract, the Contractor will be engaged in activities and services that may lead to important Governmental decisions. The Contractor, including all employees and subcontractors, shall at all times clearly communicate its status as a Contractor, including but not limited to proper identification in e-mail communications, teleconference calls, and meetings, to assure that all participants can differentiate between Federal employees and Contractor employees/subcontractors. The Contractor shall perform in such a manner as to assure that other parties, Government or otherwise, are informed the Contractor is not acting in any official Government capacity. Contractor-generated documentation shall also clearly identify the Contractor status as independent from the Government and not acting in any official Government capacity.
- 4.4 This is a Non-Personal Service contract. The Contractor is responsible for the quality of work, and the Government will perform inspection and acceptance of the completed work in accordance with Federal Acquisition Regulation (FAR) Clause 52.212-4, Alternate 1, (a) Inspection and Acceptance, Government Quality Assurance, and other relevant provisions of this Contract. Contractor employees (and subcontract employees if applicable) performing services under this Contract will be controlled and supervised at all times by Contractor management personnel. Supervision over staff is the domain and direct responsibility of the Contractor. Contractor management shall ensure that its employees properly comply with the performance work standards, and perform duties independently and without supervision by Government personnel.
- 4.5 Services provided by this Contract are not intended to, and do not, include Inherently Governmental Functions. The duties and responsibilities set forth in this SOO may not be interpreted or implemented in any manner that impedes or pre-empts the Government's decision-making process, discretion or authority, or results in the Contractor, or any of its employees or subcontractors, creating or modifying Federal policy, regulatory interpretation, or strategies; obligating funds of the Government; overseeing the work of Federal employees; providing direct personal services to any Federal employee; or otherwise violating Government prohibitions against Contractor performance of Inherently Governmental Functions. Inherently Governmental Functions are not to be assigned to Contractor employees or subcontractors.

5.0 Performance Requirements:

The Contractor shall identify time needed to perform each task and must present a timeline schedule as part of the proposal.

5.1 Task 1 Project Initiation Site Visit

In coordination with the COR, the Contractor shall plan a site visit. The Contractor shall gain familiarity with the site and all facilities in order to better understand visitor needs, gain an understanding of capacity and site constraints for managing vehicles. One-on-one interviews or group meetings with subject matter experts such as law enforcement and visitor services staff working daily with the public must occur.

Prior to the site visit, the Contractor shall have reviewed all background information such as related studies/plans, and visitation statistics and have a solid understanding of the project and project context. Specific dates for the site visit shall be determined by the project team. Any remaining data gaps shall be identified and brought to the attention of the USFWS. The Contractor shall also research additional, relevant, project information (e.g., local and regional transportation data, information, studies) from published sources. The Contractor shall analyze the information and data; gain a thorough understanding of the project, project context, and existing conditions; and determine a qualitative assessment of representative trends including any changes since prior transportation studies.

The Contractor shall assume at least one site visit for approximately 2-4 days.

Deliverables

- Site Visit/Meeting Notes
- Data Evaluation and Data Gap Analysis

The Contractor is responsible for taking and distributing meeting notes during the site visit. A draft of the meeting notes shall be sent to the COR via email in MS Word (2010 or earlier). The COR will distribute to all attendees for review (with track changes enable) and commenting prior to reply to Contractor. Attendees will be given a minimum of 7 business days to review the draft and return comments to the COR. The COR will send comments to the Contractor to incorporate or respond to and then finalize the meeting minutes. The final meeting minutes must be provided to the COR in .pdf within 15 days after approval with changes addressed.

The Contractor shall present a data evaluation and gap analysis to the COR. The Contractor shall make and changes and refinements to the documents as needed. Drafts of the evaluation shall be submitted to the COR for 15 day review period. Any changes requested by the COR shall be incorporated in the final version of the evaluation. Final version of the evaluation will be provided to the COR within 15 days after approval with changes addressed.

5.2 Task 2: Design a Reservation System with Alternatives

Utilizing the information and analysis from the site visit and a daily parking capacity the Government will issue, the Contractor shall design a reservation system that will and alleviate parking congestion during the peak times and will improve visitor experience. The design must include the site as a whole and could be implemented within the next 1-2 years.

This system must identify all costs associated with start-up and long term system implementation, including administration, capital, operation and maintenance of the system of all recommended alternatives presented. Some example of a reservation system may be variable entrance fee structures and reservation and/or timed-entrance systems.

Deliverables

- Written draft describing the design and implementation of a reservation system with

recommended alternatives.

The Contractor shall make any changes and refinements to the document as needed. Drafts of the documentation shall be submitted to the COR for review. Any changes requested by the COR shall be incorporated in the final version of the draft report. Final version of all documents will be provided to the COR within 15 days after approval with changes addressed.

5.3. Task 3 Final Recommendations on the design and implementation of a reservation system.

Contractor shall provide a final report on the design and implementation of a reservation system incorporating review and comments submitted via email or secure file transfer. The draft of the report shall be distributed by email in MS Word (2010 or earlier). Distribute to the COR (with track changes enabled) and commenting prior to finalizing the draft report. The final draft report will be distributed as a pdf (Adobe). USFWS staff will be given a minimum of 30 business days to review the draft and return comments to the Contractor. The Contractor will incorporate or respond to comments and then finalize the report within 30 days after approval with changes.

All draft and final versions of Task 3 documents will be stored in a format that both the Contractor, COR and key stakeholders identified by the COR have access, but are secured from public access. All documents will use a tracking history to allow anyone to add notes and comments during the draft process.

5.4 Option 1 On-site oral presentation of final reservation system recommendations

This is an optional task which may be required as a result of the final recommendations. Contractor shall include travel and an onsite presentation of results of project to the public as part of an environmental assessment public process for implementing a reservation system. The presentation must not exceed two hours; one hour for a power point presentation with an additional one hour for a question and answer period with the public.

6.0 Government Hours and Holidays. Normal coordination hours with the Government are anticipated to be 8:00 AM – 5:00 PM, Mountain Time, Monday through Friday, excluding federal holidays. The Contractor shall plan accordingly for developing working timelines, submitting deliverables, and access to Government facilities and personnel in order to meet all milestones and deadlines. Contractor shall respond in a timely manner, defined as 48 hours or less, to the Contracting Officer or COR, or communicate ahead of time of alternate contact if away from office.

7.0 Personnel

7.1 Key Personnel: The Contractor shall make no substitutions of key personnel, to include subcontractors unless the substitution is necessitated by illness, death, or termination of employment (partnership). The Contractor shall notify the Contracting Officer within 15 calendar days after the occurrence of any of these events and provide the information required below. The Contractor shall submit the information required to the Contracting Officer at least 15 days before making any permanent substitutions. The Contractor shall provide a detailed explanation of the circumstances necessitating the proposed substitutions, complete resumes for the proposed substitutes, capabilities or/and any additional information requested by the Contracting Officer. Proposed substitutes should have comparable qualifications/capabilities to those of the persons (Contractor) being replaced. The Contracting Officer shall notify the Contractor within 10 calendar days after receipt of all required information of the decision on substitutions. This Contract may be modified to reflect any approved changes of key personnel.

7.2 Security: Work is anticipated to be offsite. If work is onsite then the Contractor shall comply with

agency personal identity verification procedures identified in the contract that implement Homeland Security Presidential Directive-12 (HSPD-12), Office of Management and Budget (OMB) guidance M-05-24, and Federal Information Processing Standards Publication (FIPS PUB) Number 201. Related cost to obtain the proper clearance (i.e. NACI, fingerprint etc.) will be reimbursed at cost.

8.0 Data Rights

The Government has unlimited rights to all documents/material produced under this contract. All documents and materials, supplied and produced under this contract shall be Government-owned and are the property of the Government with all rights and privileges of ownership/copyright belonging exclusively to the Government. All materials supplied to the Government shall be the sole property of the Government and may not be used for any other purpose. The Contractor shall request permission to publish or make public any data relating to this contract. This right does not abrogate any other Government rights.

9.0 Points of Contact

Changes to the below will be made in writing by the Contracting Officer. Changes to the contracting officer will be made by modification to contract (See contract for Name, Phone and Email address).

**Contracting Officer Representative:
Contracting Officer:**

10.0 Quality Control

The Contractor is responsible for quality control. As part of this contract the Contractor must address how it intends to ensure quality control and express its approach to the project’s success. Regular progress reports are required. Success is defined as meeting the objective of the project, and shall cover the following elements:

- 10.1 Quality of Product or Service
- 10.2 Schedule
- 10.3 Cost Control
- 10.4 Business Relations
- 10.5 Management of Key Personnel

11.0 Delivery

All products must be delivered by the Contractor in a format indicated in the below table. Hardcopies must be sent to USFWS Kauai National Wildlife Refuge. Simultaneous with each product delivery, the Contractor must notify via e-mail the CO and COR:

- 11.1 Task Deliverables

Task 1:

Product	Format	Delivery Date
Site Visit/Meeting Notes	Electronic (MS word and .pdf)	

Data Review and Gap Analysis	Electronic (MS Word and/or Excel)	
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Task 2:

Product	Format	Delivery Date
Written Draft Reservation System	Electronic (MS Word and/or Excel)	

Task 3:

Product	Format	Delivery Date
Final Plan on design and implementation of a reservation system	Electronic (MS Word and .pdf) and 10 bound hardcopies	

Option 1:

Product	Format	Delivery Date
On-site oral presentation of the Reservation System recommendations	Power point presentation	

Appendix D: Proposed Short-Term Shuttle Service Schedule

Vehicle	Community Agriculture Center	Refuge
Cutaway 1	10:00 AM	10:08 AM
Cutaway 2	10:10 AM	10:18 AM
Cutaway 1	10:20 AM	10:28 AM
Cutaway 2	10:30 AM	10:38 AM
Cutaway 1	10:40 AM	10:48 AM
Cutaway 2	10:50 AM	10:58 AM
Cutaway 1	11:00 AM	11:08 AM
Cutaway 2	11:10 AM	11:18 AM
Cutaway 1	11:20 AM	11:28 AM
Cutaway 2	11:30 AM	11:38 AM
Cutaway 1	11:40 AM	11:48 AM
Cutaway 2	11:50 AM	11:58 AM
Cutaway 1	12:00 PM	12:08 PM
Cutaway 2	12:10 PM	12:18 PM
Cutaway 1	12:20 PM	12:28 PM
Cutaway 2	12:30 PM	12:38 PM
Cutaway 1	12:40 PM	12:48 PM
Cutaway 2	12:50 PM	12:58 PM
Cutaway 1	1:00 PM	1:08 PM
Cutaway 2	1:10 PM	1:18 PM
Cutaway 1	1:20 PM	1:28 PM
Cutaway 2	1:30 PM	1:38 PM
Cutaway 1	1:40 PM	1:48 PM
Cutaway 2	1:50 PM	1:58 PM
Cutaway 1	2:00 PM	2:08 PM
Cutaway 2	2:10 PM	2:18 PM
Cutaway 1	2:20 PM	2:28 PM
Cutaway 2	2:30 PM	2:38 PM
Cutaway 1	2:40 PM	2:48 PM
Cutaway 2	2:50 PM	2:58 PM
Cutaway 1	3:00 PM	3:08 PM
Cutaway 2	3:10 PM	3:18 PM
Cutaway 1	3:20 PM	3:28 PM
Cutaway 2	3:30 PM	3:38 PM
Cutaway 1	3:40 PM	3:48 PM

Cutaway 2	No pickup	3:58
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Appendix E: Shuttle Cost Assumptions and Results

The table below outlines the assumptions used for the Volpe Center’s bus lifecycle cost model. This model projects the cost of owning and operating a 25-30 passenger cutaway vehicle on the Refuge service. Leasing a vehicle would include engine and transmission overhaul.

Table 22: Inputs for Volpe's Bus Lifecycle Cost Model

Input	Cutaway	Passenger Van
Fuel Cost per Gallon (gasoline)	\$2.81	\$2.81
Maintenance Cost per Mile	\$2.50	\$2.50
Engine Overhaul (covered in lease)	\$15,000 - \$20,000	-
Transmission Overhaul (covered in lease)	\$10,500	-
Inflation	3%	3%
Driver Wage (fully loaded)	\$36.00*	\$36.00*
Fuel Economy (MPG)	7	14
Community Agriculture Center-Refuge: Round-trip Route Mileage / # of vehicles /# of round trips per vehicle	1.6 miles / 2 vehicles/18 trips	1.6 miles / 3 vehicles/24 trips
LHV-Refuge: Round-trip Route Mileage / # of vehicles /# of round trips per vehicle	2.8 miles / 2 vehicles/15 trips	2.8 miles / 4 vehicles/15 trips
Anaina Hou-Refuge: Round-trip Route Mileage / # of vehicles /# of round trips per vehicle	4.4 miles / 3 vehicles/10 trips	4.4 miles / 6 vehicles/10 trips

*Source: Kaua'i Bus

Appendix F: GSA Leasing Requirements

The following are the steps of the GSA leasing process as outlined by the GSA Leasing Officer for the State of Hawai'i.

Step 1:

Vehicle requests should be on agency letterhead, addressed to Emilda Prado, Acting District Fleet Manager, GSA Hawai'i Fleet Management Center

Requests should include the following information:

- An existing GSA Fleet account (BOAC number).
- The POC name, address, phone, fax & e-mail address,
- Reason for requesting the vehicle (include any national security relation, if any).
- Type of vehicle(s) needed, with details for trucks (GVWR, accessories needed, etc.).
- Where vehicle(s) will be used – state, address, zip, etc.
- State that it is long-term lease only (usually the life of the vehicle).
- State that funding is authorized and available.

The letter can be faxed, e-mailed or sent via regular mail to our office:

General Services Administration
Hawai'i Fleet Management Center
300 Ala Moana Blvd Rm 1-336
Honolulu, HI 96850
Fax number is: (808) 541-2036.

Once we have the formal request we will add it into our system and assign a request number.

Step 2:

The agency will need to elevate their additional vehicle request to their headquarters level who in turn should communicate the request to GSA's Central Office. Authority to order an additional vehicle for an agency is given by our Central Office only after conferring with the proper headquarters personnel of the requesting agency.

The point of contact for GSA's Central Office is Kevin Gibson. His contact information is: kevin.gibson@gsa.gov, (703) 605-2930.

Fleet Service Representatives (FSRs) will also check our list of Vehicles Available to Transfer (VAT) periodically to see if there is an EXCESS vehicle (terminated by another agency) that might meet requested need. If FSR finds a vehicle, he/she will advise the agency, providing vehicle information and shipping costs, and ask the agency to consider it. If the agency wants the vehicle, FSR will arrange delivery; however, the agency will be billed for shipping/moving costs. If we find no 'excess' and the vehicle is needed before we can provide one, agency should seek other sources such as commercial lease/rental, or GSA 751 Lease program (see your FSR).

GSA cannot guarantee an additional vehicle, but we will do our best. We will look for EXCESS vehicles, and hope for authority and funding to purchase ADDITIONAL vehicles each year. Just keep in mind that the majority of funding goes for High Priority (national security requests), although we do get to purchase a few ADDITIONALs every year.

Accepting an EXCESS vehicle gets an agency into the program and provides a vehicle at a reasonable cost until it can be replaced with the agency's specific vehicle need.

To help you determine the type of vehicles you may need for your mission, please check out the Federal Standards website: <http://apps.fss.gsa.gov/vehiclestandards/>