# Honolua Bay and Līpoa Point Scoping Report


## Honoapiʻilani Highway
## West Maui, Hawaiʻi
## TMK (2) 4-1-001:010

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**State of Hawaiʻi**
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**Division of State Parks**

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# HONOLUA BAY AND LĪPOA POINT SCOPING REPORT
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**PREFACE**

This report was completed in April 2018. Its activities and findings reflect what was compiled and assessed during the 2017 and early 2018 period; however, several events that transpired since then should be noted.

In July 2018, the DLNR implemented a tree hazard removal project that left trunks and remnant debris along the pathway to Honolua Bay. This initiated concerns and criticisms of the management of the Honolua Bay area. DLNR is working with community members on appropriate follow-up actions. In September 2018, severe rains and floods occurred in the Honolua and Honokōhau area which underscore concerns of long-term impacts from upland areas and the need to consider the mauka-makai relationships and their implications on public safety, shoreline, and coastal areas.

These two events illustrate the importance for DLNR to coordinate its interim management activities with agency and community stakeholders, such as those involved in the Honolua Bay tree hazard removal project. The DLNR will also need to work on long-term measures that will include areas not owned by the State to ensure that future activities in these areas do not impact State resources and facilities. These events also point to both the need for long-term management and strong inter-agency collaboration to strengthen the interim management of Līpoa Point while the management plan is being developed.

## EXECUTIVE SUMMARY

### Purpose

The purpose of the Honolua Bay and Līpoa Point Scoping Report is to provide the DLNR with a scope for developing a management plan for land acquired by the State of Hawai‘i from Maui Land & Pineapple Inc. (MLP) in 2014. The property is located makai of Honoapi‘ilani Highway and includes Honolua Bay, Kulaoka‘e‘a (the headland and coastal areas of Līpoa Point), Keonehelele‘i Beach (aka Windmills), and portions of Honōkohau Bay. It is the home to abundant marine resources, terrestrial plants, historical and archaeological sites, and ocean recreation. This collective area will be referred to as Līpoa Point.

Līpoa Point was owned by several entities and families. In 1969 MLP acquired the property and focused on pineapple cultivation. After its acquisition in 2014, DLNR acted to preserve the environmental, cultural, and recreational resources in Līpoa Point through a management plan. The management plan will balance current and future uses and practices with appropriate policies and actions. This report is the first step of an extensive planning process to identify the scope and content of a Līpoa Point management plan.

### Scoping Methodology

Various methods for data gathering and analyses were used in the completion of the report, including research of existing documents, reports, and studies; an outreach process that involved DLNR staff, adjacent landowners, recreational and commercial users; as well as meetings with lineal and generational descendants of the Honolua and Honōkohau areas.

### Public Outreach Process

Stakeholder outreach was a critical component of the report’s planning process and was conducted in two phases from December 2016 through November 2017. Phase 1 focused on community assessment and meeting design while Phase 2 focused on public and agency outreach. These phases included agency and stakeholder discussions, stakeholder interviews, focus group meetings, planning charretes, and a public workshop event. Participants were queried on why they valued Līpoa Point, what they felt were the most important issues facing the area, and what were the most problematic activities and uses. Stakeholders were also asked to identify the area’s greatest needs for infrastructure, facilities, and future management actions. Common issues of concern included overuse by out-of-state visitors, commercialization, insufficient management, sediment and surface runoff, soil remediation of previously cultivated areas, and restoration of native habitats.

### Major Planning Challenges

The report identified a lack of information in the following areas: parking counts/analysis, user survey, flora/fauna survey, drainage/sedimentation analysis, cultural resource scoping survey and consultations, and an update of the 2007 archaeological inventory survey to include areas not previously surveyed. In addition, there were several planning challenges identified, including the following: coastal resilience and climate change, upland development, overuse, sense of place/character, and management complexity. Management complexity is partly attributed to the gaps that exist between the management of upland areas that are not owned and controlled by DLNR and the management of makai areas that are controlled

by DLNR since these upland areas directly impact coastal and shoreline areas that are under DLNR management.

**Next Steps**

The next steps include determining a management plan and scope including: vision statement, documentation of threats and management issues, delineation of management roles and responsibilities, recommendations for management and facility improvements, and an implementation and monitoring strategy. In the long term, Līpoa Point will need a management structure that may include involvement and partnerships with community/stakeholder organizations, a private land trust(s), public-private partnerships, or for-profit concessionaire/lessee. An environmental assessment prepared in accordance with Chapter 343, Hawaii Revised Statutes, will be required for the management plan and its subsequent implementation.

**Report Organization**

Section 1.0 of the scoping report provides an overview of Līpoa Point's physical setting, history, land use entitlements, and significant resources. Using available reports and studies, Section 2.0 provides a description and assessment of Līpoa Point's facilities, natural areas, archaeological resources, and coastal hazards. This section also identifies additional information needed to support the preparation of a management plan for Līpoa Point. Section 3.0 highlights the input collected through the public outreach process. Section 4.0 uses the information collected from the previous sections of this report to identify major planning challenges. Section 5.0 lays out the next steps in the planning process, including the preparation of recommendations for the future management of Līpoa Point and required environmental studies.

## 1.0 INTRODUCTION

### 1.1 Background and Purpose

Located on Maui's remote northwestern coast, the stretch of land spanning from Honolua Bay to Honokōhau Bay possess some of Hawai'i's most unique cultural, archaeological, and natural resources. Only a few miles from the urbanized towns and resorts of Lāhainā, Kapalua, and Kā'anapali, this unique area includes pristine bays, jagged cliffs, and open vistas. Glassy surf surges into the bays, and beneath the water an extensive structural coral reef protects a plethora of marine life. Many cultural sites sacred to the Kanaka Maoli can be found along the cliffs, which provide stunning views of Lāna'i and Moloka'i. These distinguishing features make this area one of Maui's most beloved natural sites. Locals and visitors alike gather here to reconnect with nature, participate in cultural practices, and engage in some of Maui's best recreational activities.

Throughout the years this area has grown in popularity and use, which presents complex challenges for future management and protection of the natural resources. In 2014, following a major effort by the community and political leaders, the State of Hawai'i purchased 244.12 acres of land encompassing the coastline between Honolua Bay and Honokōhau Bay, including Līpoa Point.

The purpose of this report is to provide information and data to support the DLNR in the preparation of a management plan that will help to preserve this area. The report includes data and research collected from agency and stakeholder meetings, a community open house, and technical studies.

### 1.2 Location

The project area consists of 244.12 acres of land stretching from Honolua Bay to Honokōhau Bay on the west coast of Maui, approximately 10 miles north of Lahaina (Figure 1). The area is within the Honokōhau and Honolua ahupua'a.

The 244.12-acre project area is identified as TMK (2) 4-1-001:010. It incorporates most of the makai lands of the four-mile stretch of Honoapi'ilani Highway between Honolua Bay and Honokōhau Bay. The project area includes three embayments

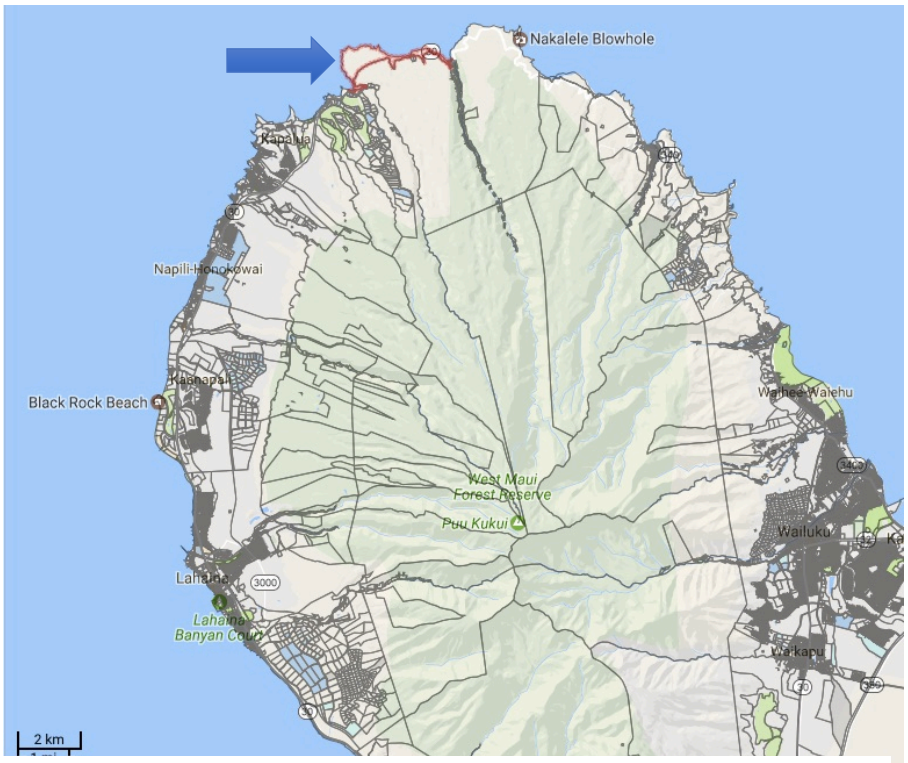



**Figure 1** – Project Area's location in west Maui, Hawai'i.

(Honolua, Keonehelele'i, Honokōhau); two popular beaches (Honolua, Keonehelele'i); three gulches (Honolua, Pōhakupule and Punaha); a rugged volcanic cliff line around Līpoa Point; a large, wide, flat, formerly cultivated table land on the Kulaoka'e'a plateau; and the mouth of the Honokōhau Stream (Figure 2).

### 1.3 Climate

Average annual rainfall in the Honolua area ranges from 30 to 40 inches along the coastline to over 300 inches in the mountains (Price 1983 in Dega and Pickett, 2007). Water flows from the upper portion of the watershed or ahupua'a down-slope through gulches and streams to the ocean. Peak rainfall occurs during the winter months of November through April (ibid). The area has mild and consistent year-round temperatures, moderate humidity, and steady north-northeasterly trade winds. The average temperature varies from 64 to 88 degrees Fahrenheit throughout the year, with winter temperatures 5 to 10 degrees cooler than the hotter, drier summer (ibid).

### 1.4 Place Names and Historical Background

The area's lineal and generational descendants have shared that place names have mo'olelo that reveal the significant features and uses to their aina; their place they are akin to. They note that an understanding of place names is an essential part of maintaining a spiritual connection to, and appreciation for, the land. Teaching and learning the history of a place, and its names, fosters a better understanding of, and respect for, the land, which is necessary when developing policies and programs for the management and restoration of culturally significant and sensitive places.

Hono-a-Pi'ilani collectively refers to the six bays[1] of Kā'anapali Moku[2] whose names begin with Hono, or bay, as well as the islands that were seen from them and ruled by Pi'ilani, the ali'i (chief) who unified Maui Komohana (West Maui) and Maui Hikina (East Maui). The bays Honolua and Honokōhau frame the project area to the west and east respectively. Honolua Bay's English translation is 'two bays', which offers insight into the physical characteristics of the bay. These two bays house a beautiful coral reef ecosystem and renowned surf. Prior to 1978, this area was also an important fishing ground for the kānaka maoli. The Hawaiians called the large plateau overlooking Honolua Bay "Kulaoka'e'a" which means "dusty plain or plain of dust." The lineal and generational descendants say that in ancient times this area was a hill and that a hōlua slide was located here. The hill was later graded to make way for pineapple cultivation.

[1] From Honokōwai, driving towards Kahakuloa on Hono-a-Pi'ilani Highway, the six bays are Honokōwai (bay drawing fresh water), Honokeana (cave bay), Honokahua (sites bay,) Honolua (two bays), Honokōhau (bay drawing dew) and Hononana (animated bay).

[2] In northwest Maui, the Kā'anapali moku contains eleven ahupua'a land divisions: Honokōhau, Honolua, Honokahua, Nāpili, Honokeana, 'Alaeloa, Mailepai, Kahana, Māhinahina, Honokōwai, and Makaīwa.

**Project Area**
The project area encompases 244 acres on the seaward side of a nearly four mile stretch of Honoapiʻilani Highway. The parcel begins just East of the Honolua Bay Access Trail runs upslope and includes a large flat table-land before going inland and over Pohakupule and Punaha gulches, and ends on the Eastern side of Honokōhau Stream.

PACIFIC OCEAN

Punalau Point

Līpoa Point

Keonehelele'i Beach
aka: Windmills

Honokōhau Bay

Kulaoka'e'a

TMK: (2) 4-1-001:010

Honoapiʻilani Highway

Līpoa Point Acces Driveway

Honoapiʻilani Highway

340

30

Punaha Gulch

Honolua Bay

Pohakupule Gulch

Honolua Bay Access Trail

Legend

Approximate Project Area Boundary

Papua Gulch

Google Earth

Not to Scale

© 2018 Google

**Līpoa Point by the Numbers:**

- The project area is 244.12 acres
- The project area encompasses nearly four miles of coastline
- The parcel is located in the State Conservation and Agricultural Districts
- The project area is located outside of the Maui Island Plan's growth boundaries
- The parcel is located within the Special Management Area

Līpoa Point, a headland of Kulaokaʻeʻa, is named for the limu līpoa found along the shoreline. Limu līpoa was frequently gathered by the kānaka maoli as an important source of food.

From Līpoa Point, there is a clear view of Molokaʻi. Maui and Molokaʻi have a special connection through the views afforded from Līpoa Point and the ocean currents that separate them.

In the embayment region of Kulaokaʻeʻa Point is Keonehelele'i Beach, which means "the scattered sand", currently known as "Windmills Beach" because Honolua Ranch once maintained a windmill along the stream bank, just mauka of the beach. Northwest of Keonehelele'i Beach is Honokōhau Bay, which translates in Hawaiian to "the bay drawing dew" or "the bay where waters congregate." This most likely refers to the freshwater that flows down from the valley and enters the bay. Due to its plentiful supply of water, Honokōhau Valley has historically been one of the largest areas for kalo cultivation on Maui.

Throughout the Honolua area there are places of great cultural and historical value. Hawaiian ceremonial and sacred sites, such as the Honuaʻula Heiau in Honolua and the Maiu Heiau in Honokōhau Valley, still exist in the area. The project area has seen much change over the course of time. King Kamehameha I, who had conquered Maui in 1790, bestowed the ahupuaʻa of Honolua and Honokahua to King Kamehameha II. During the reign of King Kamehameha I, two European seamen, John Young and Isaac Davis, became advisors to King Kamehameha I and were instrumental in helping the military ventures of King Kamehameha I. James Young, the second son of John Young, became the chiefly advisor to King Kamehameha I and was also the childhood friend of King Kamehameha II. King Kamehameha II named James Young "Kanehoa", which meant "beloved brother-companion" (Ashdown, 1978). King Kamehameha II maintained power over the ahupuaʻa of Honolua and Honokahua until he and his wife, Queen Kamamalu, died of measles while on a trip to England.

In 1836 an American missionary and physician named Dr. Dwight Baldwin moved to Maui. He, along with J.F. Pogue and S.E. Bishop, were later granted land at Māhinahina and Kahana Ahupuaʻa for farming and grazing. Dr. Baldwin's son, Henry Perrine Baldwin, founded Honolua Ranch in 1890. The ranch grew to 24,000 acres by 1902 and would encompass the ahupuaʻa of Honolua and extend to Honokōhau Bay ("Our Plantation Heritage"). The first manager of Honolua Ranch was Richard Searle, an ex-sea captain from England. He had a Hawaiian wife who had inherited lands from the ancestors of Kamehameha, Konia, Lunalilo, Davis, and the Young families. As the Honolua Ranch grew, it supported several Hawaiian families. At this time, the Honolua Ranch was used to raise cattle and horses, grow coffee and taro, and for fishing. According to Clark, "Honolua Bay was once the site of the original headquarters of Honolua Ranch" (Clark, 1989). Inland of the bay there was "the main ranch house, several other homes, a machine shop, a saddle shop, a nursery, a coffee warehouse, and a company store" (Clark, 1989). At this time steamers stopped at Honolua Bay to offload supplies and pick up cattle and other ranch products.

Henry Perrine Baldwin continued to explore the potential to grow other agricultural crops on Honolua Ranch. In this endeavor he received help from a horticulturist named David Thomas Fleming, who would be hired as the manager of Honolua Ranch (Anderson, 2016). With the advice of Fleming, the Honolua Ranch began to grow pineapple, and the industry proved to be lucrative. The headquarters of the Honolua Ranch was moved from Honolua Bay to Honokahua. The Honolua Ranch then changed its name to the Baldwin Packers Ltd. By the 1930's there were over 9,000 acres of pineapple in cultivation ("Our Plantation Heritage").

At that time Kulaokaʻeʻa, the large plateau overlooking Honolua Bay, was grassy and open. According to Clark, "during the early 1920s David Fleming built a rugged nine-hole golf course on Kulaokaʻeʻa, which was then in cattle pasture. The course was named the West Maui Golf Course and remained in use until World War II" (Clark, 1989). Remnants of the clubhouse are visible today. During World War II, portions of the course were used as an aircraft landing strip. Following the War, Kulaokaʻeʻa was used for pineapple cultivation.

With the increasing popularity of surfing in the 1960s, Honolua Bay became recognized internationally as one of the world's best right-hand surf breaks. For the last half-century, Honolua Bay has drawn surfers from throughout the world to ply its waves. The bay has had a powerful effect on the lives of many surfers who have ridden her waves.

On May 1, 1976, the double-hulled Polynesian voyaging canoe Hōkūleʻa set sail on its maiden voyage from Honolua Bay to Tahiti. As of June 26, 2018, the Polynesian Voyaging Society's website cites that the Hōkūleʻa "began as a dream of reviving the legacy of exploration, courage, and ingenuity that brought the first Polynesians to the archipelago of Hawaiʻi" (Polynesian Voyaging Society website: http://www.hokulea.com/voyages/our-story/). The 1976 launch of the Hōkūleʻa was a significant event in the renaissance of Hawaiian culture that continues to present day.

In 1969, Honolua Ranch became part of the Maui Land and Pineapple Company, Inc. (ML&P). Colin Campbell Cameron, the great-grandson of Henry Perrine Baldwin, ran the ML&P. In March 1978, Colin Cameron realized a vision he had for the bay. With Cameron's steadfast support, the State Board of Land and Natural Resources established the Honolua-Mokulēʻia Bay Marine Life Conservation District (MLCD). The purpose of the MLCD was to "preserve, protect, and conserve marine resources and geological features, and to foster recreational, non-consumptive public use of the area" (Clark, Pg. 68).

In 2006, the Save Honolua Coalition (SHC) was formed as a response to proposed residential and commercial development in the Honolua Bay Area. The SHC advocated that the area needed to be protected from innapropriate development and that it was a valuable natural resource for the Maui community. In 2014, the State of Hawaiʻi purchased 244.12 acres of land encompassing the coastline from Honolua Bay to Honokōhau Bay following a tremendous effort by the community, guided by the SHC and the state's political leaders to protect the area from development and to preserve the area's cultural, archaeological and natural resources.

## 1.5 Project Area

The project area consists of several distinct areas:

**Honolua Bay** is located at the southwestern end of the project area. The bay contains two vibrant reefs and numerous fish assemblages, making it one of the most popular snorkeling locations on Maui. The coastline around the bay is mostly volcanic rocks and boulders backed by steep cliffs. A small patch of sandy cobble beach persists at the back of the bay adjacent to the mouth of Honolua Stream.


*Looking to the east across Honolua Bay, Maui.*

Several footpaths connect Honoapi‘ilani Highway and Honolua Bay following and/or crossing Honolua Stream. Tall invasive trees with large canopies inhabit the area; most of the plants and trees in this area are non-natives. This forms a dense forest that is green, diverse and that has numerous vines extending to the forest understory. This has created a unique “jungle” like feel that is an attraction to tourists strolling between the parking area and the bay.

Honolua Bay is popular with snorkelers who access the bay by using one of the licensed commercial tour boats or the footpaths that connect the bay to Honoapi‘ilani Highway. Other popular activities at the bay include surfing, diving, swimming, fishing (outside of the MLCD), native Hawaiian gathering, cultural practices, and sunbathing.

*The trail to Honolua Bay, Maui.*

*Families enjoying a day of snorkeling at Honolua Bay, Maui.*


*An aerial view of Honolua Bay, Maui.*

**Kulaoka'e'a and the headland of Līpoa Point** make up the central area and largest portion of the parcel. This area includes rugged volcanic coastal cliffs, gulches, streams, beaches, several bays, and a relatively large, flat, fallow agricultural area. The fallow fields consist of approximately 150 acres of gently sloping plateau that rises from 135 feet in elevation at Līpoa Point to 188 feet where the project area abuts Honoapi'ilani Highway. Following World War II, this central portion of the project area was used for pineapple cultivation as reflected by its State Land Use Agricultural Designation and County Zoning designation.


*An aerial view of* Kulaoka`e`a and Līpoa Point with the *dirt access road to the right.*

Vehicle access is provided via a relatively wide gravel and dirt driveway that descends from Honoapi'ilani Highway on the western side of the plateau along the top of the cliff line above Honolua Bay. At various places along the road, foot trails lead down the cliff to surf spots below and offer several good lookouts. The driveway terminates at a parking and turn-around area. A clay embankment and metal gate prevent further vehicle access. The coastline from Līpoa Point to Punalau is dominated by unique volcanic rock formations and sheer sea cliffs that plunge into the ocean.

Within the fallow fields of Kulaokaʻeʻa are remnants of irrigation systems for agriculture. For example, a fenced irrigation pump station is located near the remnant foundation of the former golf clubhouse. This pump does not appear to be in working order. Within the plateau, there are remnant black liners and drip irrigation lines that were used for cultivating pineapple.

There are two gated, short, paved driveways on Honoapiʻilani Highway. One of the gated driveways is in the middle section of the fields (milepost 33.5), and the other is located on the far eastern end of the fallow fields (milepost 34). This latter access abuts an unmaintained drainage basin that has a crumbling concrete retention wall.

A high voltage power line is strung along utility poles adjacent to Honoapiʻilani Highway; however, there are no dams or reservoirs on the parcel. A lined irrigation reservoir is located accross, or mauka, of Honoapiʻilani Highway outside of the project area. The reservoir is on the eastern side of the former pineapple fields and appears to be in use.

*The Līpoa Point coastline with Molokaʻi in the distance.*

*Looking to the east across the fallow agricultural fields of* Kulaokaʻeʻa*, Maui.*

Along the hillside is a dilapidated ranching pen and watering basins within the shrubbery thickets. Throughout the project area are scattered unregistered campsites, primarily on the eastern edge of the fallow agricultural fields where it turns to the rock cliff around Punalau Point. The campsites do not include any sanitary facilities or running water; unfortunately, make shift fire rings on the ground are common.

The prevailing uses tend to focus on the coastline and ocean recreation. The area provides the primary access point for surfers accessing Honolua Bay and the surf breaks between Līpoa Point and Punalau Point. Other popular activities include fishing (outside of the MLCD), Native Hawaiian gathering and cultural practices, hiking, playing in tide pools, sightseeing, and informal camping.

**Keonehelele'i Beach** comprises the northeastern part of the project area and includes some of the narrowest portions of the parcel. This portion of the project area includes the cliff line, low-lying embayments, streams and beaches. Pōhakupule Gulch meets the ocean at the western end of Keonehelele'i Beach where it abuts a high sea cliff. The coastline consists of a series of steep, rugged volcanic cliffs interrupted by the Pōhakupule and Punaha gulches. Offshore is an extensive fringing reef. The western portion of this coastline has a sandy beach, often referred to as Keonehelele'i or "Windmills beach." The white coralline sand beach and the grove of ironwood trees along its mauka edge are a popular camping area that is rustic in nature and has minimal improvements. The sandy beach borders shallow coastal waters protected by a reef shelf, lending itself to soaking in the clean marine waters. Seasonally, some good surfing and bodyboarding breaks are present just off shore.

*Looking east at* Keonehelele'i Beach, Maui.

Keonehelele'i Beach is accessed from a curve on Honoapi'ilani Highway where there is a paved turnout and wide paved shoulder along the makai or seaward side of the highway. Popular activities at Keonehelele'i Beach include native Hawaiian gathering and cultural practices, sunbathing, surfing, camping and fishing.

**Punaha Gulch** lies further to the northeast of Keonehelele'i and is the last portion of the project area that offers accessible terrain. The balance of the project area to the east consists of very steep cliffs or hillsides. The gulch is visible from Honoapi'ilani Highway, which turns substantially inland and wraps around much of the gulch leading back to the coastline. Access to the gulch, and its coastline, is difficult and challenging given thickets of vegetation, stands of invasive trees and sections of barbed-wire fencing that are likely remnants from former grazing activities. One footpath is accessible from a paved turnout along the highway at the far eastern side of the gulch, at approximately milepost 34.5. The rolling slopes of this gulch make up some of the largest, relatively flat terrain fringed by sea cliffs on the northeastern section of the project area. Two adjacent private parcels located seaward of the highway interrupt the continuous nature of the parcel; however, the private parcels do not extend to the sea and therefore do not technically or physically restrict access along the coastline. Nonetheless, traversing the upper coastline or passing by the properties on their makai side may be impracticle.

**Honokōhau Bay** is located at the very northeastern end of the project area. The project area is only a small sliver of land that exists between the roadway and the stream and bay. This end of the project area

includes a steep cliff that is inaccessible. The Honokōhau portion of the project area has no apparent infrastructure.

*The western extent of the project area* includes the *hillside between Honoapi'ilani Highway and Honokōhau Bay.*

*Looking mauka up* Honokōhau Stream.

*Aerial view of Honokōhau Bay.*

## 1.6 Adjacent and Surrounding Uses and Project Area

**Makai of the Project Area**

Marine waters in Honolua Bay and to the west of Līpoa Point are within the Honolua-Mokulē'ia Bay Marine Life Conservation District (MLCD) established by the DLNR in 1978. No fishing or taking of marine life, sand, or coral is permitted in the bay. The bay has become a very popular snorkeling site attracting a growing number of tourists over the past several decades. The bay also hosts excellent surfing seasonally on its eastern side below the sea cliffs of Kulaokaʻeʻa. Fishermen use the cliff trails to fish just outside of the MLCD. The boundary of the MLCD extends from the high-water mark seaward to a line from ʻAlaelae Point at Mokulē'ia to Kalaepiha Point on the southwestern edge of Honolua Bay to a point at the northwestern corner of Honolua Bay, below the access road to Līpoa Point (DLNR DAR, 2017).

Marine waters offshore to Molokaʻi are within the Hawaiian Islands Humpback Whale National Marine Sanctuary. The sanctuary is comanaged by the Federal National Marine Fisheries Service (FNMFS) and the state DLNR. The sanctuary's northeastern boundary stretches from Līpoa Point across the Pailolo Channel to Cape Halawa on the eastern tip of Molokaʻi (NOAA, 2017). As such, marine waters to the east of Līpoa Point, such as offshore of the Keonehelele'i coastline, are not within the whale sanctuary.

**Mauka of the Project Area**

Substantially mauka from Honolua Bay is the Plantation Estates – an upscale, luxury agricultural home development surrounding the private Kapalua Golf Course (Figure 3). Discharges of fertilizer, pesticides,


**Figure 3** – Agricultural areas on and around Līpoa Point and Honolua Bay. Plantation Estates to the right.

and other chemical treatments associated with landscaping, grounds-keeping and fairway maintenance may be adversely impacting water quality and coral reef vitality within Honolua Bay. Within the bay's waters, and from the Līpoa Point Access Driveway, there are several large homes that overlook the bay and diminish the naturalness of the setting.

Several moderately-sized privately-owned properties are located mauka of the highway and upslope of the bay in the valley formed by the Honolua Stream. Some of the properties are developed with single-family homes. The use and development of these lands is not inhibited by SMA review, since the mauka extent of the SMA boundary is the Honoapi'ilani Highway. ML&P owns a narrow tract of land across the highway from the lookout over Honolua Bay. The parcel (TMK (2) 4-2-001:044) is 8.658 acres but is mostly undevelopable given its configuration and steep topography.

ML&P owns a much larger tract of nearly 2,750 acres of land on the opposite side of Honoapi'ilani Highway from Honolua Bay at Honolua Stream. This single area follows the stream and its gulches more than seven miles inland and up the slopes of the West Maui Mountains. The area is predominantly within the state Conservation District, Resource subzone. However, it is not within the county SMA and portions of the area are zoned agriculture or interim by the county. Subdivision and development of land with these types of land use entitlements may be challenging; but are not impossible depending on the end desired.


**Figure 4** – Agricultural areas mauka of the Keonehelele'i coastline.

Mauka of the highway bordering Līpoa Point and extending past the Nākālele Blow Hole is an extremely large parcel owned by ML&P. The parcel (TMK (2) 4-1-001:009) is nearly 5,375 acres, extends upland over three miles, and much of it is county zoned agricultural (Figure 4). Honokōhau Stream nearly splits the parcel in two equal halves with many small lots located near the stream.

The western half of the parcel is located across the highway from the fallow fields on the plateau of Līpoa Point. This western, mauka portion of the ML&P parcel has an irrigation reservoir next to a series of large flat agricultural fields. Both the state and county designate this parcel for agricultural use, and it is not within the SMA or conservation district. If this mauka area were developed for residential use, such as

subdivision for multiple farm dwellings, it could result in an increased number of people using Honolua Bay, Līpoa Point and Keonehelele'i Beach. Such a development could also have a significant impact on the area's natural character and would likely lead to increased sedimentation in Honolua Bay and neighboring coastal waters.

East of Keonehelele'i Beach and Punalau are two private landholdings on the mauka side of the highway. The parcels (TMK (2) 4-1-001:021 and 012) are 2.291 acres each and are adjacent to one another. They are both developed with residential homes. The two mauka properties are not within the conservation district, are not within the county SMA, and are both designated for agricultural use.

*Aerial view of the Kulaoka`e`a plateau split by the Honoapi'ilani Highway.*
**Note the irrigation reservoir mauka (upland) of the project area.*

**Parcels on the Western Side of the Project Area**

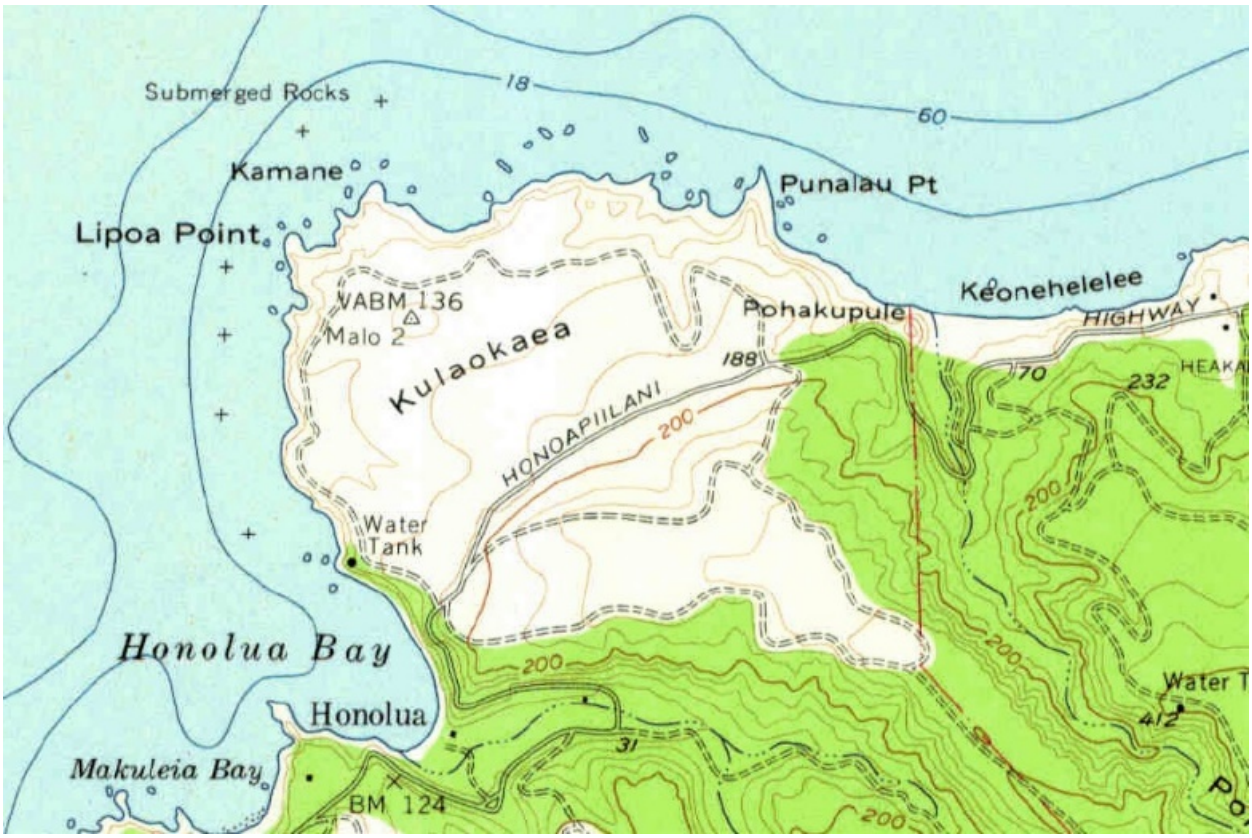
ML&P owns a 1.4-acre parcel on the north side of Honolua Stream that abuts the Honolua Bay access trail. On the opposite side of the stream and trail, ML&P owns a 9.1-acre parcel (TMK (2) 4-2-004:032) that incorporates most of the southern half of the bay's accessible landmass. This parcel includes the southern access trail to the bay, a dirt road access to the bay, and abuts several roadside parking areas.

**Parcels Bound by the Project Area**

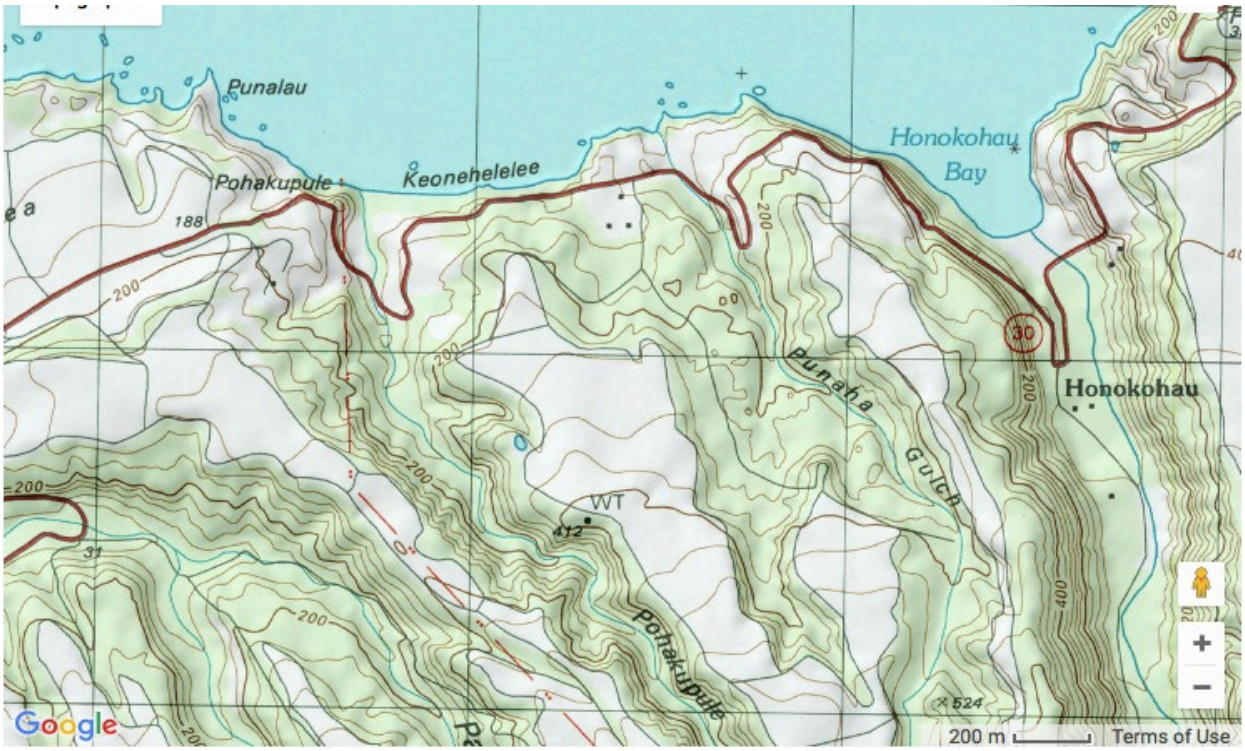
The project area is a nearly contiguous parcel that extends from Honoapi'ilani Highway to the sea. However, there are a few private land holdings that are located on the makai side of the highway that interrupt the contiguous nature of the parcel. At Honolua Bay, Les Potts owns a 0.217-acre parcel (TMK (2) 4-1-001:008), Gilbert Chee Trust owns an adjacent 0.25-acre parcel (p007), and ML&P owns a 0.05-acre parcel (p009). All three parcels are located just inland of the shoreline.

East of Keonehelele‘i Beach atop a sea cliff is a 1.25-acre parcel (TMK (2) 4-1-001:011). This parcel parallels and is located on the makai side of Honoapi‘ilani Highway, but its boundaries do not extend to the shoreline. The lot is developed with several dwellings. Coastal access along this portion of the Keonehelele‘i coastline is constrained by the single-story buildings or dwellings, which are clearly visible from the roadway, as well as the topography of the coastline.

Each of the aforementioned private parcels is within the county special management area and the state conservation district. Any proposed use or development of these lands would require both state and county reviews and approvals, thereby reducing their potential to adversely impact the natural environment and cultural and public trust resources.




*Excerpt from the USGS Topographical map of Līpoa* Point.




*Excerpt from the USGS Topographical map of the Keonehelele'i coastline.*

### 1.7 Land Use Entitlements

The land use entitlements for the project area (TMK: (2) 4-1-001:010) are 1. State Land Use Designation of Conservation (resource, general and limited subzones) and Agriculture; and 2. West Maui Community Plan Designation of Conservation along the shoreline and Agriculture in the area previously in agricultural use. The former agricultural fields are also county-zoned for agricultural use. The project area is located outside of the Maui Island Plan's growth boundaries, while the coastline is within a planned protected area – preservation designation.

Conservation areas are regulated under HRS 183C and HAR 13-5-13. The State of Hawai'i categorizes conservation areas are into seven resource subzones. These subzones range from rather permissive to very restrictive, depending on the topography and ecological resources being conserved. Portions of the project area are within the general, resource, and limited subzones (Figure 5). Areas seaward of the shoreline are within the State Conservation District Resource Subzone unless otherwise noted, such as the MLCD, which is in the protected subzone to recognize and protect the MLCD's valuable natural and marine resources.

Lands mauka along Honolua Stream, and adjacent and to the west of the MLCD, are in the resource subzone to ensure sustainable management of these areas. Examples of uses identified by HAR 13-5-13 for areas within the resource subzone include park and outdoor recreation, limited agriculture, and kuleana land uses. Lands makai of the agricultural fields of Kulaoka'e'a and between Honolua Bay and Honokōhau Bay are in the limited and general subzones.

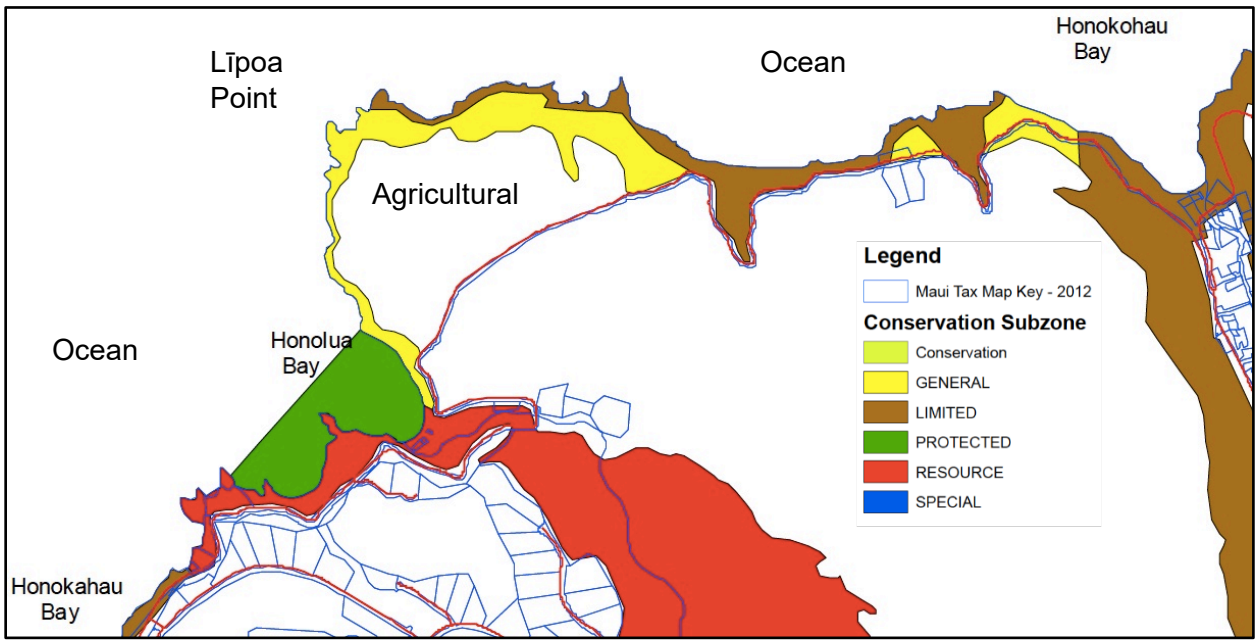



**Figure 5** – Conservation district subzone designations.

Areas within the limited subzone tend to include steep cliffs, rocky outcrops and areas susceptable to erosion, flooding and storm surge. These areas are highly regulated to protect unique and sensitive resources and public health and safety. The western edge of Kulaokaʻeʻa is in the general subzone to, in part, protect the area's open space resources. There are also areas in the general subzone that lie between Kulaokaʻeʻa's agriculturally designated lands and those areas in the limited subzone. These areas are located on Kulaokaʻeʻa's northwestern flank, and have significant open space, natural and cultural resource value. They also serve as a buffer between the project areaʻs agricultural lands and sensitive coastal areas.

The project area is also within the Special Management Area (SMA) and will require an SMA permit or request for exemption, depending on the type of development proposed.

The environmental, cultural and hazard concerns and associated governmental oversites include shoreline setback rules of the Maui Planning Commission, which address beach erosion and preservation issues; flood inundation areas as noted in the Flood Insurance Rate Maps (FIRM) issued by the Federal Emergency Management Administration; sea level rise projections; wetland designations regulated by the federal

| **Honolua Bay / Līpoa Point** | |
|---|---|
| TMK: | (2) 4-1-001:010 |
| Ownership: | State of Hawaiʻi |
| Parcel Area: | 244.12 Acres |
| Entitlements: | |
| State Land Use: | Conservation<br>Resource Subzone<br>General Subzone<br>Limited Subzone<br>Agriculture |
| Maui Island Plan: | Outside of the Urban Growth Boundary<br>Protected Area - Preservation |
| Community Plan: | Conservation<br>Agriculture |
| Zoning: | Agriculture (Līpoa Point Ag Field) |

government through the Army Corps of Engineers; natural fauna and flora (native and endangered) overseen by the U.S. Fish and Wildlife Service; and archaeologically significant sites (such as burials and cultural deposits) that are regulated by the DLNR.

### 1.8 Significant Resources within the Project Area

The lineal descendants of the Honolua ahupuaʻa and Honokōhau ahupuaʻa, as well as other residents and visitors to the area, have a deep spiritual connection to the place. To the area's lineal and generational descendants, the ʻāina (land) provides a life source that sustains their community, and the wahi pana (sacred places) provide guidance to the history of the place and the culture of the Hawaiian people (stakeholder interviews and focus group meetings, 2017), (Kanaʻiaupuni et. al., 2006).

The project area represents a roughly four mile stretch of one of Maui's last publicly owned and undeveloped shorelines. The stretch of coastline beyond Honolua Bay remains wonderfully remote and retains a feeling of serenity. This area consists of Kulaokaʻeʻa, Līpoa Point, and Keonehelele'i Beach to Honokōhau Bay. The coastline is one of the few places on Maui where views of both Molokaʻi and Lānaʻi are visible. The geologic formation of this coast provides spectacular panoramas of rugged cliffs, crashing waves and gentle bays.

Honolua Bay itself boasts one of Maui's best structural coral reefs. The reef is one of the highest coral coverage sites on the island of Maui. As such, the area is important for fisheries recruitment and its potential to create spill-over effects from abundant, expanding fish populations. The reef provides shelter to a diversity of marine life, including native fish, limu (seaweed), green sea turtles, eagle rays and Hawaiian spinner dolphins. Every year, visitors from around the world snorkel in the bay's warm, pristine waters.

Numerous archaeological sites have been documented within and near the current project area, including heiau, human burials, petroglyphs, monumental architectural agricultural complexes, ancient trails, a hōlua slide, as well as a number of permanent and temporary habitation sites (Scientific Consultant Services, Inc. ,2007). On the east side of Honokōhau Valley there is a large, terraced heiau, which is named Maiu (ibid). It is believed that the heiau was used for human sacrifice. Maiu is one of the last heiaus consecrated by King Kamehameha II (Anderson, 2016). There is a stone trail leading up to the temple that is said to be a section of the famed Alaloa, or Long Road, that circled the island (ibid.), the construction of which began with Piʻilani here in west Maui and later extended around east Maui by his son Kiha-a-Piʻilani to complete the trail. The Kānaka Maoli also believe that the legendary Night Marchers, the spirits of ancient warriors, roam throughout the Honolua area (Anderson, 2016). The area holds cultural and historical significance for the Kānaka Maoli.

The launch of the Hōkūleʻa was a significant event in the renaissance of Hawaiian culture that continues to present day. The Hōkūleʻa returned to Honolua Bay in 2017 as the first stop on its "Mahalo, Hawaiʻi Sail" voyage.

Honolua's deep valleys and streams provide an opportunity for expanded kalo cultivation, particularly along Honolua Stream between Honoapiʻilani Highway and Honolua Bay. Opportunities also exist to re-establish limu at Līpoa Point to support the Kānaka Maoli cultural practice of limu gathering, which was once active in this area.

Honolua Bay is home to a right-breaking pointbreak that is described by “four-time world champion Mark Richards as “the ultimate wave; the best wave in the world.” As of June 27, 2018, the Encyclopedia of Surfing website offers the following description of Honolua Bay: “beginning at an outermost section called Coconut Grove, the wave at Honolua bends into the cliff-and boulder-lined bay, passes through the cove takeoff area, and arranges itself into a long, fast, perfectly-foiled wall that spins through two or three bowl sections.” (https://encyclopediaofsurfing.com/entries/honolua-bay/). Every year local surfers, as well as surfers from around the world, gather at Honolua Bay to ply its waves.

## 2.0 EXISTING CONDITIONS

### 2.1 Facilities

#### 2.1.1 Honolua Bay

There are few facilities at Honolua Bay. Those accessing the bay from land do so via the narrow and winding Honoapi'ilani Highway. The Honolua Bay Access Trail is located just east of the one-lane bridge on the makai side of the Highway. At the trailhead an informal gravel parking lot can accommodate roughly thirteen cars. West of the one-lane bridge, on the makai side of the highway, there is an unpaved parking area that will accommodate roughly seven cars. Cars also park along the highway to the east of the Honolua Bay Access Trail. These cars can pose a safety hazard as occupants are unloading gear and entering and exiting vehicles.

There is no potable water at the bay. There are three portable toilets and a wire trash receptacle at the edge of the larger graveled parking lot next to the trailhead at Honoapi'ilani Highway leading to Honolua Bay. The portable toilets are pumped out three times per week.

There are several formal and informal signs in the gravel parking lot, along the trail from the parking lot to the bay, and at the bay.

A second set of trash receptacles are located just inland of the bay's shoreline next to two picnic tables. Fortunately, much of the waste generated by visitors to the bay is captured by the portable toilets and trash cans. However, the trash receptacles may not be adequately sized and may not be secure enough for soiled diapers or food wastes.


*Informal signage, Honolua Bay, Maui.*

*Portable toilets at the trailhead to Honolua Bay. Picnic tables and trash receptacles near the Honolua Bay shoreline.*

### 2.1.2 Kulaokaʻeʻa / Līpoa Point

There is minimal infrastructure within the plateau and the fallow fields of Kulaokaʻeʻa and the headland of Līpoa Point.

Vehicle access is provided via a gravel and dirt driveway that descends from Honoapiʻilani Highway on the western side of the plateau along the top of the cliff line above Honolua Bay. The turnoff from Honoapiʻilani Highway is located on a blind curve. The unpaved driveway has several turnouts and parking areas and terminates near Līpoa Point. The driveway provides access for surfing, fishing (outside of the MLCD), hiking, mountain biking, tide pooling, swimming and views of Honolua Bay, Molokaʻi, and Lānaʻi.

*Līpoa Point Access Driveway.*

There are no restrooms, portable toilets, trash barrels, or recycle bins or baskets at Līpoa Point or along the dirt access roadway or at the parking and turnout areas.

During the World Surf League women's professional surfing contest, portable broadcasting trailers were parked adjacent to the dirt access road at overlooks. Additional parking for spectators was created by clearing vegetation from the fallow field adjacent to the access road. Entry to the parking area was provided via a metal gate at the top of the access road near Honoapiʻilani Highway.


*Hazardous cliff signage, Līpoa Point, Maui.*

There are several "hazardous cliff" signs at the top of the trails leading from the Līpoa Point Access Driveway to Honolua Bay. Limited additional signage is in this area.

The trails around the Kulaokaʻeʻa plateau and along the shoreline are generally overgrown and hazardous.


*Informal signage, Līpoa Point, Maui.*

*Trail from Līpoa Point Access Driveway to Honolua Bay Surf breaks.*

*Trail along the* Kulaokaʻeʻa plateau.

### 2.1.3 Keonehelele‘i Beach

Keonehelele‘i Beach is accessed from a curve on Honoapi‘ilani Highway where there is a paved turnout and wide paved shoulder along the makai side of the highway. An unimproved 4-wheel drive dirt driveway leads from the paved turnout down to the beach and campsite area. During heavy rainstorms, the dirt road can be very muddy and impassible. Parking at Keonehelele‘i Beach is unimproved and informal.

There are few facilities at Keonehelele‘i Beach. ML&P provides waste receptacles for general waste and recyclables at the campsites at “Windmills Beach” at the mouth of Pōhakupule Gulch. These receptacles are emptied regularly by contracted ML&P employees. There are no toilets.

ML&P allowed camping prior to the state’s acquisition of the project area in 2014. The state is continuing to allow camping within the project area as it works with the community to identify appropriate long-term uses. Scattered campsites exist primarily on the eastern boundary of the former pineapple fields around Punalau Point and at Keonehelele‘i Beach. The campsites do not include sanitary facilities or running water, have no dedicated or portable toilets, and make shift fire rings are common.

Palette burning continues at the beach, which leaves nails to rust and become embedded in the soil or sandy beach environment. This creates a safety hazard for beach users and keiki.

There is limited formal and informal signage at the beach.


*Campsites with trash cans in the foreground at* Keonehelele‘i Beach, Maui.

**Potential Impacts and Management Issues**

The Save Honolua Coalition sponsors multiple cleanups each year. Past cleanups resulted in filling a 20-foot dumpster with rubbish and the removal of hazardous waste such as car batteries (Group 70, 2016). Les Potts, a local citizen activist and landowner in Honolua has facilitated and undertaken clean ups, especially of larger dumped items such as cars, tires and batteries, for over a decade. Floatable trash such as styrofoam food containers, plastic bottles, and paper cups can easily be displaced by wind or overland storm water and carried into near shore waters. Providing proper trash receptacles and regularly

scheduled pick up would help keep these foreign materials out of marine waters. Consideration of recycle bins, covered or rodent-proof trash receptacles, and a greater distribution and number of trash receptacles throughout this portion of the project area could be beneficial, if properly maintained, monitored, and emptied on a regular basis.

**Honolua Bay**

Improved parking facilities should be considered to ensure safe and effective access to the bay while ensuring an appropriate and sustainable level of use. Alternative restroom types (portable toilets, holding tanks for sewage treatment, trailered restrooms) should be evaluated at Honolua Bay. Each option has its own maintenance, amenity, and environmental characteristics that should be evaluated on a site-specific basis.

**Līpoa Point**

The Līpoa Point Access Driveway could be improved to include a re-grade and slope of the driveway away from the bay and the provision of a bio-swale with a buffer of native plantings on the makai side of the driveway to reduce erosion and sediment discharge into the bay. Parking improvements could also be considered to improve driveway ingress and egress particularly for emergency vehicles during busy weekends when cars are parked haphazardly along both sides of the driveway impeding access. Trailered restrooms and/or portable toilets, as well as trash cans, should be considered at strategic locations along the Līpoa Point Access Driveway.

**Keonehelele'i Beach**

Portable and/or trailered restrooms should be considered at Keonehelele'i Beach. Keonehelele'i Beach would benefit from more trash receptacles, including source separation for recyclables. Educational signs should inform users as to why pallet burning (nails) is prohibited because it is hazardous to campers and beach users. Adequate trash receptacles and regular maintenance could reduce the need for ongoing trash cleanups by capturing floatable waste before it is swept into the ocean by rainstorms and streams.

**Information Limitations**

Knowledge of the quantities, types, and regularity of rubbish accumulation at Honolua Bay and Keonehelele'i Beach each and campsites could help better inform solid waste management, collection and removal services. While the absence of receptacles encourages "packing it out", the presence of source separated bins for recyclables and solid waste offers an option to effectively manage waste and reduce litter.

*Palette burning and rusting nails at Keonehelele'i 'i "Windmills Beach."*


*Trash receptacles near campsites at Keonehelele'i Beach.*

## 2.2 NATURAL AREAS

### 2.2.1 Watersheds and Bays

The subject project area straddles the Honolua and Honokōhau watersheds incorporating five sub-basins (Figure 6). While Honolua has been studied quite extensively, especially Honolua Bay, there is scant data for the Honokōhau watershed.

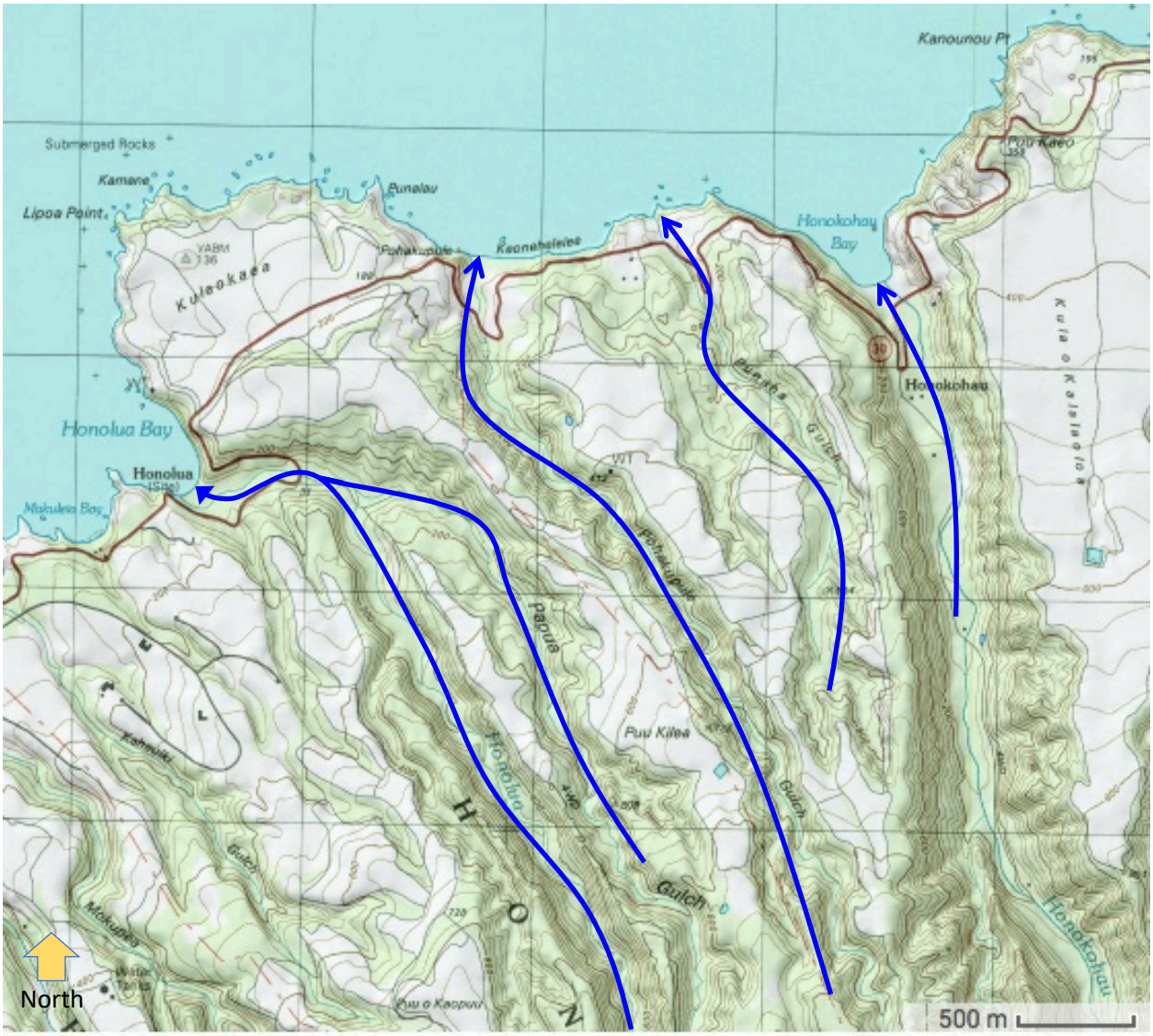



**Figure 6:** Streams and gulches within the watershed that affect the project area.

#### 2.2.1.1 Streams and Gulches

<u>Honolua Bay</u>

The Honolua watershed includes Honolua Stream, Papua Gulch, which drains to Honolua Stream, and surface runoff from the western side of Līpoa Point and the western half of the former pineapple fields on the plateau above the point (Figure 7). The eastern portion of the Plantation Estates agricultural subdivision and part of its golf course also drain into the bay. The bay is the recipient of storm runoff and

base flow from Honolua Stream and its tributaries, which extend about twelve miles upland to an elevation of approximately 3,900 feet. The bay is a sink for sediment eroded from exposed areas or scoured from stream banks within the surrounding watershed. The bay may also be a sink for coral polyps emanating from Olowalu (Storlazzi, & Field, 2008) during certain times of the year when conditions are favorable. These young coral recruits are usually dispersed during spawning season and carried by currents along West Maui's coastline eventually reaching Moloka'i and Lāna'i. Some of these polyps may settle in the bay's relatively quiescent waters, given the bay's orientation and protection from prevailing winds afforded by Līpoa Point.

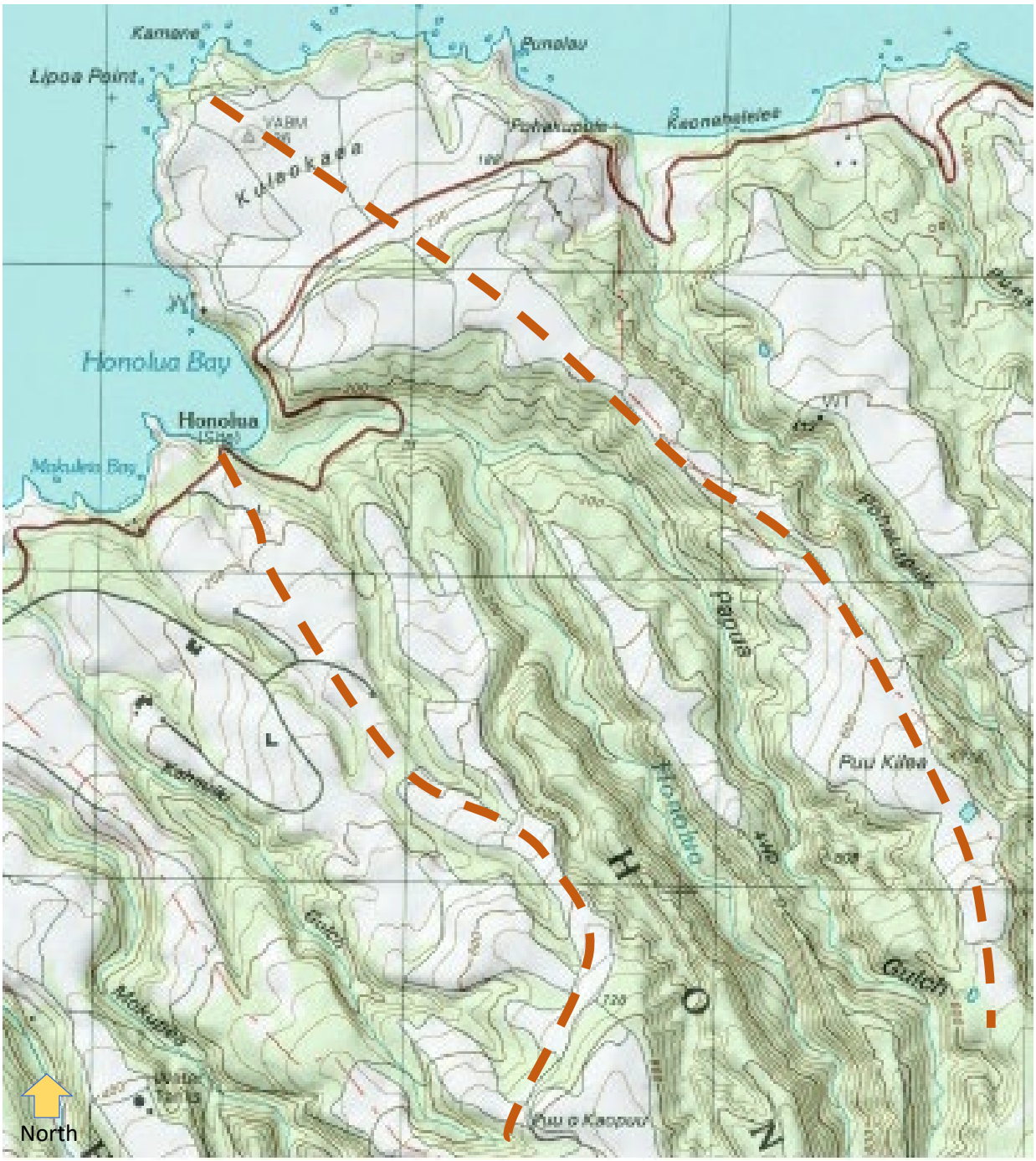



**Figure 7:** Upland areas that drain to Honolua Bay.

**Līpoa Point**

Līpoa Point and the fields and table lands inland of the point are split between the Honolua and Honokōhau watersheds. Areas to the east of the point flow towards the ocean and/or Pōhakupule Gulch. Areas to the west of the point flow towards the ocean and/or Honolua Bay.

**Keonehelele'i Beach**

The Honokōhau watershed includes the Pōhakupule and Punaha gulches, which are ephemeral streams, and the Honokōhau stream, which is perennial and runs all year long. They form three distinct sub-basins that discharge to the ocean separately (Figure 8). The eastern half of the former pineapple fields drain into the Pōhakupule Gulch which extends upland and inland of Keonehelele'i Beach "Windmills Beach." The gulch is often dry but can accommodate large volumes of storm water that slows and spreads out at the mouth of the stream at the western end of the beach. Further to the east, the Punaha Gulch discharges into the ocean and extends inland and upland to Pu'u Kilea at an elevation of 732 feet. This gulch drains a smaller area than Pōhakupule Gulch and is surrounded by hale koa thickets seaward of the highway. Honokōhau is a much larger watershed extending well inland and upland for several miles, but it represents a very small portion of the Līpoa Point project area. This section of the project area is mostly steep cliffs that rise approximately 200 feet from Honokōhau Stream to the Honoapi'ilani Highway.

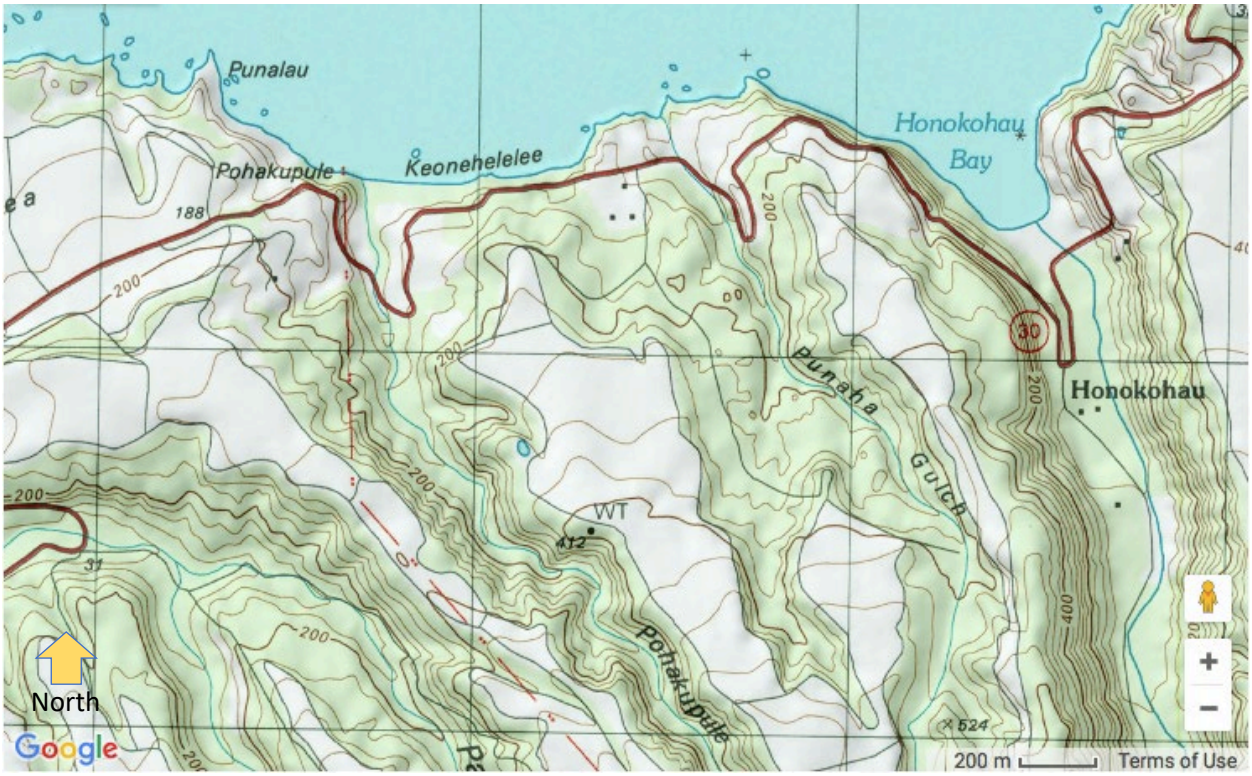



**Figure 8**: Freshwater gulches, streams and drainages on the eastern side of the project area**.**

**Potential Impacts and Management Issues**

The Ridge to Reef (R2R), West Maui Watershed Partnership, Pu'u Kukui Watershed Preserve and other conservation organizations have undertaken many projects and actions to improve the watershed during the past decade. Working with upland landowners in a collaborative manner, R2R has facilitated feral

ungulate control, erecting fencing to keep ungulates out of sensitive habitat, habitat restoration and native species protection.
The drainage area for each watershed is very large and upland land use and its management can have significant influence on water quality, especially in Honolua Bay and Keonehelele'i Beach. Watershed manager actions (i.e. West Maui Watershed Partnership, R2R, and Pu'u Kukui) help improve water quality along the Līpoa Point project area's coastline and its adjacent bays, reefs, fisheries and marine ecosystem. Stream diversions may affect nearshore benthos community composition, and salinity contours. Stabilizing legacy sediment along stream embankments so that it is not washed into the bay may help reduce turbidity and nutrient bioavailability. Reducing wallows created by ungulate hooves may improve the bay's turbidity by reducing sediment inputs and a source of pathogens. Storm water management, reducing landscaped runoff, and modernizing individual wastewater treatment systems could reduce sources of nitrogen that can lead to algal overgrowth in reef ecosystems. The positive impacts on nearshore water and reef quality resulting from good watershed management practices in upland areas could well exceed any specific actions taken on the Līpoa Point project area. Accordingly, coordinating with watershed managers is highly recommended.

Taking a holistic approach to potential stressors is critical considering climate change, warming sea temperatures and sea level rise. These larger forcing factors will result in longer, more frequent, and more acute periods of stress on the reef ecosystem and the fisheries it supports. Improving the vitality and diversity of a reef system strengthens its capacity to recover after bleaching events and other perturbations.

**Information Limitations**

There is scant information on the frequency, quantity, or quality of freshwater flow from the Pōhakupule and Punaha Gulches (Figure 8). A stream diversion exists nearly 4.5 miles up the Honokōhau Stream as shown on USGS topographic maps of the area. The diversion directs freshwater to irrigation tunnels, flumes and canals that flow towards Kapalua across ML&P lands and extends past Kā'anapali. ML&P owns much, if not all, of the irrigation ditch according to county tax records. As such, ML&P is assumedly a primary beneficiary of the diverted flow and is likely to have the best information on flow volumes. While this flow data may be of interest, it is unlikely to significantly contribute to the management of the Līpoa Point project area given only a small portion of the project area is near the Honokōhau Stream.

The HDOH Clean Water Branch does not monitor water quality in the Pōhakupule and Punaha Gulches, Honokōhau stream, the Keonehelele'i coastline or Honokōhau Bay. As such, local residents are most likely to be the best source of information on brown water events and water quality in these areas. Agricultural practices on upland plateaus, feral ungulate control (fencing/hunting of pigs, goats, etc.), and the spread of invasive plants within each of these sub-basins may be key factors in the amount and significance of sediment, nutrients, and runoff into nearshore marine waters.

A decade ago, Chaston & Oberding (2007) identified the following actions to be taken to fill stream hydrology and associated biological information limitations:

1. Comprehensive survey of stream flora and fauna;
2. Quantity and quality of stream flow;
3. Watershed scale hydrological studies and modeling;
4. Stream monitoring program; and
5. Effects of stream diversion on stream and marine biota.

Since that time, Honolua Bay and its watershed continue to be studied and water quality sampling is now more frequent. Determining the primary sources of sediment and nutrient inputs into the bay could help narrow and focus management efforts to better control negative effects on coral reefs and the health of snorkelers and divers from stressors.

Additionally, the US Army Corps of Engineers recently installed a stream gauge on Honolua Stream and they are working on some watershed level hydrological models. Results from storm water monitoring in the upper reaches of the watershed should be forthcoming. The work was conducted by Chris Brosius for the West Maui Mountain Watershed Partnership.

In comparison, there continues to be scant data on the Honokōhau Watershed and how it impacts the project area. Quantitative and qualitative data and information for the Pōhakupule and Punaha Gulches is lacking. Such information could better inform management decisions.

### 2.2.2 Groundwater Flows

Regional and local groundwater migration is strongly influenced by surface drainage, topography, and the permeability of the underlying soils. The project area overlies the Honolua and Honokōhau aquifer systems of the Lahaina aquifer sector. Groundwater generally flows to the north toward the Pacific Ocean, toward Honolua Stream along the western boundary of the project area, toward Pōhakupule Gulch (to the east of Līpoa Point), and toward Honokōhau Stream (along the far eastern project area boundary).

**Honolua**

The Honolua aquifer system is comprised of volcanic aquifers including unconfined basal, unconfined high-level dike, and unconfined high-level perched aquifers. A free basal lens in Wailuku basalt occurs for at least two miles inland of the coast, followed by high-level dike water which extends to the boundary of the system. All high-level water is impounded in dike compartments. The basal lens saturates flank lava flows, but widely spaced dikes may reach to the coast. Outflow of the basal lens is not impeded by cap rock (Mink and Lau, 1990 in AMEC, 2014). Depth to groundwater and groundwater flow direction are tidally variable.

**Līpoa Point**

Līpoa Point is within the Honolua aquifer system. Estimated depth to groundwater at the former pineapple fields portion of the project area is approximately 100-150 feet below ground surface (AMEC, 2014). Localized groundwater flow patterns and depths, which differ from these conditions, may exist due to differing subsurface conditions, local recharge factors, and/or local groundwater pumping.

**Honokōhau**

The Honokōhau aquifer system is comprised of volcanic aquifers including unconfined basal, unconfined high-level dike, and unconfined high-level perched aquifers. A rift zone extends all the way to the sea but within a mile of the coast, basal groundwater occurs in Wailuku basalt dike compartments. The perennial flow of Honokōhau Stream is sustained chiefly by high-level dike water. Perched water seeping from the Honolua series also contributes to the Honokōhau stream's low flow. Basal groundwater has not been developed with wells. In the lower reaches of the valley, alluvial fill behaves as a weak cap rock (Mink and Lau, 1990 in AMEC, 2014). Some of the stream water is diverted into the Honokōhau Ditch which is located well inland (about 4.5 miles) and upland at an elevation of 700 feet in the stream valley. The ditch diverts water for use farther south in Kapalua, Kā'anapali and Lahaina.

**Potential Impacts and Management Issues**

The primary activities on the project area that could influence groundwater would be to control extraction (i.e., wells) and prevent contamination of groundwater. The Department of Health implements an Underground Injection Control (UIC) Line relative to groundwater wells. The line is the boundary between underground sources of drinking water (up gradient) and non-drinking water aquifers (down gradient). Injection wells used to dispose of wastewater underground are required to ensure that the fluids disposed do not migrate and pollute underground drinking water sources.

The project area is down gradient of the UIC Line and the underlying aquifer is not considered a drinking water source. Injection wells below the UIC line, such as for wastewater disposal, would be permissible under certain conditions if authorized by the Hawai'i Department of Health (HDOH). A Phase I ESA in 2014 found no evidence of drinking (i.e., potable) wells or injection wells on the parcel (AMEC, 2014). The drilling of a well for either potable or irrigation water could be constrained by the fact that the project area is located downhill and seaward of the UIC line. As an alternative, a reservoir for irrigation is located just mauka of the highway around milepost 34. The reservoir is downhill from the ditch. As the reservoir is located on ML&P owned land, acquiring access to water is feasible, provided the owner is a willing seller or willing to offer a lease.

**Information Limitations**

The relative contribution of subsurface and groundwater flows to Honolua Bay, Keonehelele'i Beach, and Honokōhau Bay are not well quantified. In contrast, contributions of nitrogen and phosphate from groundwater discharges have recently been quantified (Armato D.W., et. al., 2016). Research has established interactions between submarine groundwater discharges affected by anthropogenic activities and nearshore water quality and marine community composition (Whittier& El-kai, 2014 & Armato D.W., et. al, 2016). Similarly, nutrient loading in coastal waters has been associated with macro algal blooms and coral reef degradation (ibid). In Armato's 2016 study, Honolua Bay and two other sites were considered low nutrient sites compared to three other sites found to have high nutrient loads from groundwater discharges. Comparisons were made relative to algal growth and near shore water quality, and the relative influence that groundwater discharges had at the six locations. Their results suggest that groundwater can transport large amounts of nutrients that adversely impact coastal ecosystems. However, the results also suggest that contamination from groundwater flows into Honolua Bay is less than contamination from groundwater flows in other, more developed embayment's and coastal areas on Maui.

Given the high use of Honolua Bay for snorkeling and diving, and its plethora of protected coral and marine life, it is generally believed that sediment inputs leading to turbidity in the bay are a leading cause of stress to coral reefs in the bay, albeit not the only one (PIFSC, 2017).

Continued studies of contaminants and their relative contribution to Honolua Bay's water quality and coral vitality, as compared to overland runoff and stream flow could be helpful.

### 2.2.3 Water Quality

**Honolua**

Honolua Bay is fed by two sub-basins; Honolua Stream and Papua Gulch. Papua Gulch is an ephemeral tributary of Honolua Stream entering on its eastern side, but it is dry and without flow 50% of the time. Honolua Stream flows begin at a much higher elevation of approximately 3,900 feet in the West Maui mountains within the Pu'u Kukui Watershed Preserve 12 miles to Honolua Bay. The headwaters begin in a narrow and steep valley where the stream ranges from 3 to 27 feet wide and there are several waterfalls

within the stream's first mile. The 1990 Hawai'i Stream Assessment defined Honolua as a perennial stream with continuous flows to the ocean. The USGS estimated the stream supports mauka to makai flow less than 80% of the time (Cheng, 2014 in Group 70a, 2016, page 4-18). Honolua Stream meanders inland of the bay to discharge to the ocean on the southern (Kapalua-side) edge of the bay.

HDOH samples water quality from the shore near the stream mouth. In the past, the site was sampled three to four times a year, but that has increased in frequency to near monthly sampling since 2015 (HDOH, 2017). Samples were generally taken early in the morning and tested for clostridium and enterococci levels. A beach advisory would be issued if enterococci exceeded the threshold level of 130 per 100 ml. Since January 2015 there have been a dozen time enterococci exceeded 130 per 100 ml, several of which were very high, reaching to 2005 per 100 ml. High clostridium levels (e.g., 20) were detected on four occasions since 2015. Combined, the monitoring suggests that the bay's waters are frequently deleterious to healthy ocean recreation activities such as snorkeling. In almost all cases, Honolua Stream was flowing.

There is one stream diversion at an elevation of 800 feet consisting of a metal grate across the stream from which ML&P diverted about 3 million gallons a day to the Honokōhau Ditch. The ditch helped irrigate crops from 1903 until 2004 but now the diverted water is returned 100 feet downstream to the main stream channel. From 1913 to 1917 a USGS gauge (16623000) measured natural stream flow at an elevation of 840 feet, just above the diversion. More recently, stream flow is estimated to be 3.8 cubic feet per second (ibid.).

**Modeling Inputs**

Using INSPECT, a raster-based computer program, the amount of soil and fertilizer entering Honolua Bay was modeled (Group 70a, 2016, Table B.1, page B-2). The model estimated that Līpoa Point had 5,629 tons of soil, equating to seven pounds of phosphorous and 44 pounds of nitrogen annually lost from a 66-acre drainage area within the Līpoa Point plateau table lands. Of the 66 acres of the plateau that drains to the bay, 57 acres or 87%, of the total area was fallow and no longer in crop production.

Upland of Honolua Bay from the Honolua Stream watershed the model estimated that nearly 31,978 tons of soil, equating to 361 pounds of phosphorous and 8,001 pounds of nitrogen, was lost annually from a 2,545-acre drainage area (Group 70a, 2016). Fallow crop land comprised only 4% or 101 acres of the total Honolua Stream drainage area. The USGS estimated a suspended load of more than 345 tons/year in Honolua Bay based on INSPECT modeling (ibid.). Raw fecal matter from ungulates, as well as contributions from a nearby, upslope, fertilized golf course covering 95 acres, could also be contributing to nitrogen loads within Honolua Bay. Excess nitrogen in seawater enhances the ability of algae to grow and helps algae dominate or overtake the coral reef ecosystems.

**Metals**

Volcanic soils often have high metal concentrations such as lead, cadmium, and chromium. These micro-metals may be found in soils and sediments given their heavy weight, and are moved upward from the depths of the earth to its crust and soil because of volcanism.

Certain metals can induce accelerated growth in corals and algae, including certain micro-metals (Rodriguez et. al., 2016). In fact, most organisms require a small, minute amount of metals to exist. However, an overabundance of metals can be toxic to life.

The concentrations of nine metals were assessed in sediments and in marine organisms including algae, goatfish and urchins (Hedouin et. al., 2011). High concentrations of carbon monoxide (Co), chromium (Cr), manganese (Mn), Nickel (Ni) and vanadium (V) were measured in sediments from Honolua and Honokōhau Bay but not in the organisms (except for Mn). This suggests that metals are bound in sediment and inert (non-reactive). These metals may have high natural background levels within the watershed given its volcanic origin. The study found a significant correlation of Co, Cr, Mn, Ni, V, Zinc (Zn) concentrations in sediment in Honolua Bay with the loss of coral cover. The study concluded that land-based stressors (sediment and nutrients) appear to affect coral health more than merely metal stress alone (ibid.).

**Legacy Inputs**

Past pineapple cultivation in the sub-watershed created a network of many miles of access roads and stream crossings that are contributing sediments to nearshore waters (Group 70b, 2016). Sources of sediment that contribute to turbidity were identified as the highway; numerous upland dirt tracks in cane fields; as well as the impact of feral ungulates such as pigs introduced in the 1920's for hunting, axis deer, and invasive weeds that alter hydrology and soil capacity (Group 70a, 2016).

Within the Honolua sub-basin are 12.7 miles of road and three stream crossings which may contribute to sediment loading. Given the length of the watershed (12 miles) and its rise to 3,900 feet in elevation, the potential contribution of feral ungulates, such as pigs and deer, to the release of sediment could be substantial. Legacy sediment is dirt that has eroded from fields and upland areas in years past only to rest in gulches and stream beds. During heavy rainstorms, these sediments can be released by scouring and carried downstream and into Honolua Bay. Some of this latent sediment could be from poor land management practices, past and/or present, both agricultural and developmental.

**Turbidity**

Turbidity is a measure of the clarity of marine waters. High turbidity results when sediment is suspended in the water column. Sediment particles scatter sunlight reducing visibility and the amount of sunlight that can reach benthic organisms, such as corals, that depend on photosynthesis for survival. The Hawai'i State Department of Health (HDOH) measures turbidity by calculating the amount of light that is scattered in a sample of water (i.e., Nephelometric Turbidity Unit or NTU). Honolua Bay was one of four West Maui locations where HDOH recorded high turbidity during sampling from 2008 to 2011 according to water quality data posted on the Clean Water Division's website.

Most of the Honolua Watershed is within the State Conservation District which strictly regulates upland development and urbanization. However, the bay itself still has turbidly readings that are 6 to per 100 ml per 100 ml 7 times the water quality standard set by HDOH (Group 70b, 2016, pg. 2-5). Turbidity was measured as 3.50 nephelometric turbidity units (NTU) in Honolua Bay in contrast to the State of HDOH standard of 0.2 NTU. High turbidity levels in Honolua Bay have long been considered a deleterious aspect of marine water quality in the vicinity (PIFSC, 2017).

*Turbidity in Honolua Bay induced by high surf along Līpoa Point's cliff line.*

Excessive suspended solids, or the resuspension of sediment within the water column, can adversely impact coral growth and vitality. When sediment settles on a coral's exterior, the coral must expend energy by sloughing off the sediment from its exterior membrane. Sediment also blocks and deflects the transfer of sunlight within the water column thereby diminishing photosynthesis by symbiotic algal cells within the coral. This starves the algae and the coral polyp which makes the coral susceptible to weakening, disease, blight, and bleaching. (Edinger et. al., 2011)

Turbidity in Honolua Bay is high. Compared to other coastal areas where sediment is more readily flushed out, sediments in Honolua Bay can be resuspended for long periods of time. In addition to upland inputs, incoming waves and seasonal currents can resuspend sediments within Honolua Bay, as opposed to flushing them out of the bay, thereby amplifying their adverse effect on corals and the reef ecosystem in the bay.

**Potential Impacts and Management Issues**

Inferior agricultural soil management practices over decades led to significant contributions of sediment into the bay and legacy sediment accumulation in gulches that may still contribute to turbidity and water quality impairment. Additionally, more complex modern chemical stressors such as sunscreen, pesticides, herbicides, rodenticides, lawn and golf course turf care products, and runoff from roadway asphalt, have introduced potential stressors to the nearshore marine life. The impact of these stressors is unknown, however, Honolua Bay has suffered from excess turbidity and brown water events over the past decade, if not longer. Studies also found a correlation between sediment-laden metals and decreased coral cover (Hedouin et. al., 2011).

**Honolua Bay - Vehicle Generated Contaminants**

There is minimal infrastructure to support visitors to Honolua Bay. Parking occurs along the road shoulders. The parking spaces are not delineated or demarked, although some "no parking" signs are

posted along the Honoapiʻilani Highway and at a private, unimproved driveway to the bay. There are two main pedestrian trails from Honoapiʻilani Highway to the bay. Presently there are parking areas at each of these locations, some paved, some graveled and others based on a wide roadway shoulder.

Vegetative Best Management Practices (BMPs) should be used on the makai side of the Honoapiʻilani Highway, especially where there are steep slopes adjacent to the roadway. The parking areas in proximity to Honolua Stream are sources of soil, loosened sediment, oil, and waste that can enter the stream or gulch and be carried out to Honolua Bay. Non-structural BMPs should be implemented to help reduce the potential for sediment and contaminant inputs to marine waters from these source areas.

**Honolua Bay - Visitor Generated Contaminants**

Honolua Bay is a popular destination for snorkeling and diving in the summer and surfing in the winter. Sunscreen with oxybenzone has been found to negatively impact corals (Group 70b, 2016). Visitors, tourists, snorkelers, divers, and surfers that enter marine waters could be negatively affecting water quality and coral reef vitality with their choice of sunscreen. A ban on sunscreen containing oxybenzone is a potential policy measure and has been hotly debated by the Maui County Council but has not been enacted into law. However, volunteers have handed out free samples of "reef friendly" sunscreen and educational materials at various parks including Kalama Park and ʻĀhihi-Kīnaʻu Natural Area Reserve in Makena. Similar efforts and/or educational signs at Honolua Bay may be a worthy investment.

**Līpoa Point**

A major source of sediment is runoff from the dirt driveway that leads from Honoapiʻilani Highway to Līpoa Point along the cliff line on the eastern side of Honolua Bay. This driveway is poorly oriented in that it is very close to the steep hillside, cuts across the topographic contour rather than following the grade and consists of easily erodible clay soils with gravel amendments. There are several dirt areas along the makai side of the driveway where drivers pull off to the side to determine ocean conditions.

*Surfer and spectator parking on the edge of the dirt access road.*

Many narrow steep access paths lead from the overlooks and/or roadway down the cliff sides to the shore below. These unimproved foot trails erode over time and could be contributing sediment to nearshore waters. Where vegetation has been trampled by foot traffic or barren spots have formed, the opportunity for sediment transfer from slope to shore increases.

When surf conditions are good, spectators park on the makai side of the road. This behavior has the potential to trample and degrade the narrow vegetation buffer along the edge of the cliff and road. In addition, many ruts and gullies have formed within the road's surface. These features are indicative of

heavy overland flow during rain events and the unconstrained release of dirt, sediment and accumulated anthropogenic pollutants (floatables, auto fluids, trash, etc.).

At a minimum, the dirt and gravel road and parking areas should be stabilized and low-growing, drought tolerant vegetation planted on the makai slopes of the roadways (Group 70b, 2016). Alternatively, an avoidance strategy would be to reorient the access road further to the east of the current, sight-limited driveway and dirt entrance.

The current entrance to the access road is located at the crest of the hill adjacent to a blind curve. In contrast, there is another paved, gated access driveway stub about one-fourth mile to the east along the makai side of Honoapi‘ilani Highway. The sight-distance and elevation change for ingress/egress at this more central location is considerably safer for motorists. A new entrance and access road that is oriented to the plateau’s contours and topography would reduce erosion potential which could in-turn improve nearshore water quality, especially in Honolua Bay.

*Dust, dirt, and ruts on the Līpoa Point access road pollute ocean waters.*

Considerable dust is generated and released from vehicles that use the access driveway, especially in the dry season, despite the dirt track being partially graveled. Sediment is released from erodible gullies during rain storms. These sources contribute sediment to nearshore marine waters that adversely affect water quality, marine life, corals, and public health of nearshore users. However, the extent of sediment released, and its eventual disposition is unknown. However, it is known that the sediment that enters Honolua Bay recirculates many times within the bay creating cumulative adverse environmental and ecological effects. Therefore precautionary, prudent mitigation measures and practices to reduce sediment inputs are recommended.

Sediment control could be improved by planting native, drought-tolerant vegetation, especially where foot trails lead from the edge of the roadways down steep cliffs to the shore below. This latter vegetative best management practice can be applied ubiquitously throughout the project area especially along high traffic pedestrian areas.

ML&P built a sediment basin in the late 1990s on the northwest corner of the former pineapple fields according to Wes Nohara, former Vice President of Production Management for ML&P (ibid.). The retention basin was constructed with a United States Environmental Protection Agency grant funded through the Department of Health and was intended to control nonpoint source pollution from the pineapple fields in response to algal blooms that occurred in the bay in 1989 and 1999. Between 1997 and 1999, ML&P constructed three silt catchment basins on the plateau to capture storm water runoff from fields and the roadway, allowing sediment to settle and excess water to discharge (AMEC, 2014). One basin appears to be located next to the paved driveway stub on the northeastern extent of fallow fields by milepost 35. The other two basins were not apparent in the Phase I Environmental Site Assessment and may have filled in with sediment and vegetation since that time (AMEC, 2014). No other pits, ponds, storm water catchment basins, retention structures, or lagoons were observed on the project area (AMEC, 2014).

Funds also paid for field terraces, road and gulch drainage improvements, field drainage improvements, plastic mulch catchment fencing at two fields, and re-vegetation of 17 acres of badlands, mainly on the Līpoa Point plateau. The NRCS claimed that the combined measures were estimated to have reduced sediment discharge into the bay by 68% (Group 70b, 2016, page 4-31).

**Keonehelele'i Beach**

Storm runoff through the Pōhakupule Gulch discharges at the mouth of the intermittent, ephemeral stream near the bottom of the cliff at the western end of Keonehelele'i Beach. The dirt road leading down the hill from the Honoapi'ilani Highway cuts against the grade of the hillside, which tends to reduce erosion. The dirt track turns onto a much wider turning area with a slight grade that is located inland of the sandy beach where storm water flows to the ocean (inset). The track leads to several rustic campsites and a turnaround. Sediment and trash can wash from these flat barren areas just above the beach down to the shallow nearshore reef shelf.

*Sediment working its way towards the nearshore waters, Keonehelele'i Beach, Maui.*

Observations of the stream mouth suggests the flow volumes are highly correlated with upland precipitation events. Observed deposition consisted of natural debris and sediment that appear to be organic and mostly granular as opposed to finer clay particles that form mud.

Along sandy or erodible shorelines, ironwoods and other invasive trees should be removed in favor of climate-adapted shade species such as milo or beach heliotrope. These species are less susceptible to erosion and are less likely to create obstacles or safety impediments if they fall into the sea.

*Evidence of embankment erosion at Keonehelele'i Beach.*

To the east of Keonehelele'i Beach, the Punaha Gulch is channelized by a culvert under Honoapi'ilani Highway. This is located at a sharp turn on the inland apex of the roadway, adjacent to derelict pens for grazing animals. The portions of the gulch on the project area are surrounded with thick vegetation, mostly hale koa shrubs.

**Information Limitations**

Honolua Bay has received more attention to water quality monitoring given its presumed higher resource utility, economic importance, and leisure draw as opposed to Honokōhau Bay. The validity of this premise should be considered within the decision-making context. Among the strategies to address turbidity, watershed stakeholders indicated a desire to retain unaltered stream flow. As such, an in-stream de-silting basin was not recommended as a means of improving water quality (Group 70b, 2016, pg. 2-5). Additional research in progress by John Stock of the United States Geological Service (USGS) could provide sediment terrace locations in the Papua Gulch (ibid.) that may lead to better management of sediment inputs.

Quantitative and qualitative data, and more frequent monitoring of water quality within Honolua Bay and near Līpoa Point could help identify the magnitude of the problem, but these efforts would not necessarily help prevent the ongoing, continued degradation of the bay and nearshore marine resources as evidenced by large declines in coral coverage. Recent work by Storlazzi on modeling coral larvae dispersal patterns shows that the larvae from West Maui provide the coral larvae to seed West Maui areas, as well as other areas in Maui Nui (C. Storlazzi Pers. Comm in Group 70b, 2016). The general direction of the coral larvae movement is from the south west to the north and offshore to neighboring Molokai and Lāna'i, but the comparative influence on Honolua Bay's reef system is not entirely clear.

Furthermore, a decade ago, Chaston & Oberding, (2007) identified several water quality information limitations including:

1. Comprehensive long-term water quality data;
2. Long-term in-situ turbidity data at coral reefs; and

3. Location, quantity and quality (nutrients and contaminants) of groundwater input.

Since that time, additional studies, reef transects, and water quality data has helped focus research and monitoring and has better informed management efforts such as feral ungulate control within the upper watershed. High sediment loading, and its resulting turbidity have long been thought to be a major contributor to reef decline in the bay. HDOH water quality sampling has occurred at more frequent intervals in the past few years as evidenced by the data posted on the Clean Water Division's website. However, continued water quality including nutrient monitoring is necessary, as is better characterization of sources of sediment in the watershed. Although agricultural production ceased nearly a decade ago, the fallow fields and vacant lands continue to be a source of legacy chemicals and fertilizers (Group 70, 2016 in PIFSC, 2017). This suggests that groundwater characterization and continued coral coverage monitoring and data could help better inform watershed management.

### 2.2.4 Geology, Soils, and Toxicology

Stearns and MacDonald of the United States Geologic Service (USGS), conducted some of the first geologic mapping of the area in 1942 (AMEC, 2014). They found that the lavas of West Maui volcano are divided into three series. The Wailuku volcanic series, consisting largely of olivine basalts with less abundant olivine-poor basalts, hypersthene basalts, and picritic basalts. The Honolua volcanic series consists of oligoclase andesites and soda trachyte. The Lahaina volcanic series consists of nepheline basanite and picritic basalts.

According to their report (AMEC, 2014), the oldest rocks on West Maui are the very permeable primitive Wailuku basalts, which were extruded probably in Pliocene and early Pleistocene time from two rifts and from many radial fissures. The basalts form a dome about 5,600 feet high and extend an unknown distance below sea level. ʻĪao Valley is the eroded caldera of this dome. Forming an incomplete veneer over the dome are the Honolua soda trachyte and oligoclase andesites. They were extruded in late Pliocene or early Pleistocene time, chiefly from bulbous domes. In the field, the Honolua lavas area easily separated from the Wailuku basalts by their massiveness and by their white and gray surfaces when weathered. Their soils are thin, seldom exceeding five feet and are buff to ochre in color given the lack of iron. In contrast, the Wailuku basalts are rich in iron oxide content giving their soils a dark red and red-brown appearance.

*Honolua flows (left) and highly erodible badlands soils (right).*

**Honolua Bay**

Stony Alluvial Land Series (rSM) can be found along streams and gulches within the Honolua Bay portion of the project area. These soils consist of stones, boulders, and sediment deposited by streams along the bottom of gulches and alluvial fans. Honolua Stream is the major force in depositional actions into Honolua Bay. Studies by the USGS are being conducted to identify the relative contributions of Papua Gulch to the bay.

Illicit dumping of solid waste has occurred in the various locations in the general area and near the project area. This waste has including appliances, vehicles, tires, batteries, construction and other forms of solid waste. Relative to the subject project area, illegal dumping was a problem in Honolua Bay that has since been rectified by community efforts led by Les Potts, among others (AMEC, 2014). Although most of these sites have been cleaned up, they have the potential for residual toxicological effects (ibid.).

**Līpoa Point**

This portion of the project area is situated at an elevation that ranges from approximately 188 feet above mean sea level (amsl) at the former pineapple fields inland of Līpoa Point down to sea level at Honolua Bay, Pōhakupule Beach and Honokōhau Bay. The United States Department of Agriculture, National Resources Conservation Service (NRCS) web soil survey indicates that the former pineapple field portions of the project area consist primarily of Alaeloa silty clay. This type of soil is characterized by well-drained soil with a moderately low to moderately high water transmitting capacity. This type of soil can serve as prime farmland if irrigated.

The Hawai‘i Land Study Bureau (LSB) rates soil productivity from high (A) to low (E) or are unclassified (U). This section of the project area’s soil productivity is rated moderate (C) or low (E). The “C” designated areas correspond to the relatively flat, fallow fields inland and upland of Līpoa Point which are designated for Agricultural uses by state land use and county zoning laws. The rocky cliff lines and the more barren areas along the fringe of the fallow fields are rated by the LSB as low productivity (E) soils, which corresponds to the conservation designated lands. Prior to 2005, a range of pesticides and herbicides were applied to the former pineapple field portions of the project area over a fifty-year period.

To the east of Līpoa Point following along the upland fringes of the volcanic cliffs and above the submerged tide pools are a varied and interesting grouping of rock formations. Most of these headlands and windswept spaces that are indicative of the Honolua lava flows in form and color. Green olivine crystals can be observed embedded in the grey, solid, pillow-like, rock formations along this unique stretch of coastline, which contrasts with badland soils found further to the east along road turn outs and overlooks.

**Keonehelele‘i Beach**

The remainder of the project area east of Līpoa Point and along the coastline consists of rock land, rough broken land, stony alluvial land, and beaches (AMEC, 2014). In the area between Līpoa Point and Punalau Point, Rock Land (rRK) series predominates consisting of areas where exposed rock covers 25% to 90% of the surface. Bedrock and shallow soil deposits are the primary characteristics of this series. The extensive exposure of different geologic rock formations contributes to the unique nature of this section of the project area. Badland soils can be found along most of the cliff lines and palis between Līpoa Point and Honokōhau. These soils are colorful (red, yellow, and purple), but are easily eroded. The soils are nutrient poor allowing ironwood trees and other weedy species to predominate.

*An overlook near the road. Most have weak, erodible soils.*

**Potential Impacts and Management Issues**

AMEC Environment & Infrastructure, Inc. conducted a Phase I Environmental Site Assessment in April 2014 for the DLNR. Typically, the purpose of an ESA is to evaluate the project area for potential chemical contamination. Results of the 2014 study were generally unremarkable. No soils were found on the project area that were stained or indicative of chemical contamination. The HDOH Hazard Evaluation and Emergency Response (HEER) recommends an ESA be prepared when there is a history of chemical use on a project area.

Since 2007, Mr. Potts has been contracted by ML&P to work along the former pineapple fields and serve for on-call maintenance for the project area according to the ESA. His duties include litter removal, highway cleanup, and reporting of any issues with field access gates to ML&P. Mr. Potts stated at the time that he makes daily rounds of the subject and surrounding properties to remove litter and empty trash and recycling containers located throughout the project area (AMEC, 2014). He occasionally volunteers in community cleanup efforts, mainly for Honolua Bay. These activities help prevent and reduce the potential for solid waste to contaminate soils at the project area.

**Honolua Bay**

The Honolua Dump was a locally known illicit dumping area near Honolua Stream according to Les Potts. Malama Maui Nui and Mr. Potts organized community-based efforts to clean up the area and remove the solid waste from the project area. The nature of the waste disposed in the former waste disposal area near Honolua Stream are unknown. Hazardous chemicals or other deleterious materials could have potentially been disposed of in this area which may have created persistent residual contamination, however there is no clear evidence that contamination exists (AMEC 2014).

**Līpoa Point**

Based on the Phase I ESA (AMEC, 2014), several remnant components indicative of agricultural use were found on this section of the project area. For example, an abandoned pump and irrigation equipment site is located next to the foot trail leading from the parking lot to the northeast.

*Remnant irrigation pump site adjacent to the Līpoa Point foot trail.*

ML&P did use pesticides and herbicides on the former pineapple fields during cultivation. These included methyl bromide, Telone, BBC, DBCP, Amdro Ant Bait, Matrix Ant Bait, Malation, Diazinon, Lindane, Karmex, Velpar, Atrazine, and Ametrine (AMEC, 2014). Thus, there exists a potential for residual contamination from environmentally-persistent pesticides known to have been used in Hawai'i for pineapple cultivation during this time. However, there was no site-specific evidence suggesting contamination is present, such as the presence of underground storage tanks or chemical mixing or storage on the project area. The pesticide mixing station was in Field 55 which is across and upland of Honoapi'ilani Highway. Field 55 also has an irrigation reservoir located well inland and uphill from the highway. The storage facility for the pesticides was located off site from the ML&P fields. Prior to 1974, these pesticides were kept at the Honolua Village facility across from the Honolua Store on Office Road (ibid.). After 1975, pesticides were kept at the Nāpili Base Yard at 4900 Honoapi'ilani Highway.

**Keonehelele'i Beach**

There are many informal overlooks and vehicle turn outs along the twisting, turning Honoapi'ilani Highway along this section of the project area. Badland soils populated with ironwood saplings predominate along much of the pali (cliff line). Foot trails in these areas are often unstable, slippery even though dry, and have unreliable footing that could lead to slips, falls, or injury. Consolidating trails, managing the contour of foot paths, adding natural snags as buffers or blockages, erecting signage, and taking other preventative measures could help reduce the potential for injury to visitors and hikers, especially at vehicle turn outs along highway and scenic overlooks.

*Illicit dumping near Honokōhau Stream.*

Dumping has mostly been stopped through community efforts and education. Mr. Potts, ML&P and the community provide trash receptacles and simple signage near the Keonehelele'i campsites. Still, some

abandoned vehicles persist on properties in the vicinity. For example, a common abandonment site is just beyond the project area's boundary (milepost 36.5) in Honokōhau on the makai side of Highway 30. Despite it being outside the project boundary, it could be a source of soil contamination or could potentially impact nearshore water quality.

**Information Limitations**

The Phase I ESA determined that the fallow fields at Līpoa Point and the former dump site site in Honolua Bay both constitute a "recognized environmental condition" (REC) given their past historic use. However, neither site is known to be contaminating nearshore waters. A Phase II study also did not find any specific hot spots or contributing contaminated areas on the project area.

### 2.2.5 Flora and Fauna

#### 2.2.5.1 Marine Life and Corals

Coral reefs have generally declined throughout Maui over the past two decades (PIFSC, 2017). The causes of these declines are complex and vary between locations, but shoreline development and human use is likely a significant contributor. For instance, declines have been recorded at Honolua Bay, Kahekili, shallow reefs off Olowalu, and at Māʻalaea (ibid.). Conversely, more remote sites have experienced increases or sustained high coral cover such as Kanahena Bay and Molokini (ibid.).

Reef decline can result from many factors. In 2004, declines at Kanahena Point, which is a relatively remote reef, were due to a local outbreak of crown-of-thorns starfish which feed on corals. Algal blooms are a frequent source of reef decline. Excess nutrients in nearshore marine waters, particularly nitrogen, promotes algal growth. This excess growth and abundance of algal in proportion to corals can create an imbalance in the reef ecosystem. However, there is clear evidence that herbivorous grazing fishes such as parrotfish and surgeonfish can control the abundance of problem algae. Herbivorous fish graze on algae and tend to keep algal growth in check, provided the fish stocks are healthy.

Degradation is also not just related to declines in coral coverage. Reductions in habitat quality and rugosity (topographical complexity) means there are less places for fish to hide from predators. Once degradation is well established, affected reefs will support less fish stocks. Fisheries can experience depletion in terms of abundance, fish biomass, species diversity, the distribution of species, and the number and type of apex predators. These losses translate to a marine area with lower recreational and commercial value to the detriment of all resource users. Recovery of herbivore stocks may be part of the solution at some locations, but without other steps to reduce land-based sources of sediment, nutrients and other pollutants, adverse impacts are likely to continue, and reef recovery will be hindered.

Given the trajectories of decline over the last decade plus, it is clear that substantial deterioration can occur rapidly on Maui's reefs. If steps are not taken to protect the conditions that foster healthy coral reefs, fish in Honolua Bay and Keonehelele'i Beach risk being decimated like those in Māʻalaea.

**Honolua Bay Reefs**

A 45-acre Marine Life Conservation District (MLCD) was created in 1978 at Mokulē'ia and Honolua Bays. The MLCD extends from the high-water mark seaward to a line from ʻAlaelae Point to Kalaepiha Point,

then to the point at the northwestern corner of Honolua Bay. It was established to protect the area's abundant marine life from human impacts and no fishing is permitted (Figure 9).

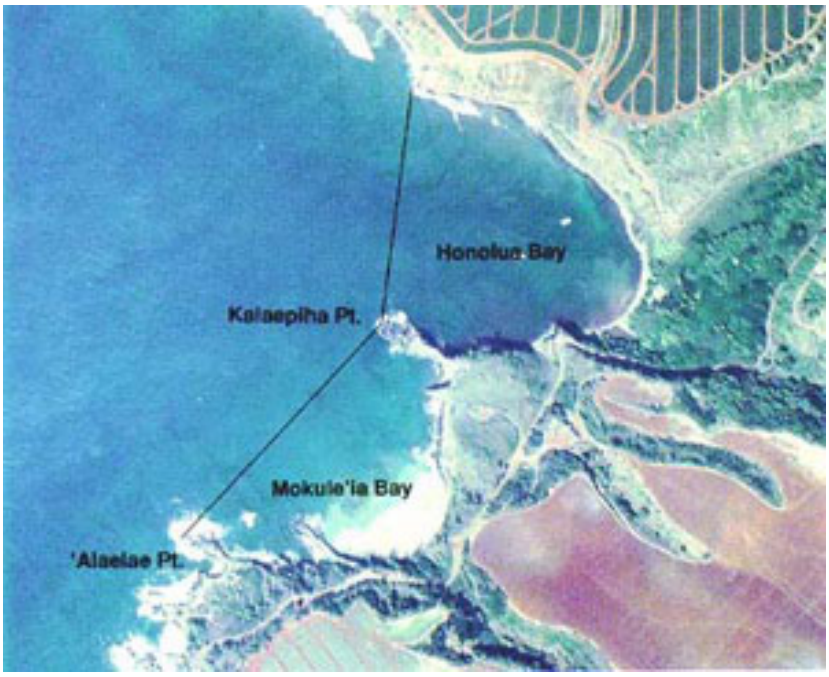



**Figure 9:** Seaward limits of the Marine Life Conservation District. *Source:* Air Survey Hawaii on DLNR DAR webpage, 2017.

Activities in the MLCD are regulated pursuant to HAR Title 13-32.

Permitted activites include:

- To possess aboard any boat or watercraft any legal fishing gear and fish or other aquatic life taken outside of the district.
- To possess in the water any knife and any shark billy, bang stick, powerhead or carbon dioxide injector.
- With a permit, to bag and remove akule netted outside of the district, provided the net is moved only over the sandy bottom areas of the district, and to engage in activities otherwise prohibited by law for scientific, propagation, or other purposes.

Prohibited activites that are not allowed include:

- To fish for, take or injure any marine life (including eggs), or possess in the water any device that may be used for the taking of marine life, except as indicated in permitted activities above.
- To take or alter any sand, coral, or other geological feature or specimen, or possess in the water any device that may be used for that purpose.


*Marine Life Conservation District prohibited activities.*

Of the submerged land in the MLCD, 35% is not colonized, 5% is unclassified, 41% is turf, and 19% covered in coral. This equates to nearly 0.034 square km of coral in the 0.183 square km MCLD site and is one of the highest coral coverage sites on the Island of Maui. As such, the area is important for fisheries recruitment and its potential to create spill-over effects from abundant, expanding fish populations. High

fish populations and coral reefs also serve to attract recreational and commercial snorkeling and SCUBA diving.

Reef formations are present offshore on the left side (southwest) and right side (northeast) of the bay. Dense coral growth formations can be observed in waters ranging from 10 to 40 feet deep in both locations. Lobe coral (*Porities* sp.) are more abundant and diverse along the northeastern shoreline, whereas rice coral (*Montipora* sp.), which are more tolerant of sediment, predominate on the southern shoreline. The middle of the bay is a sand channel, sloping gradually to a depth of about 60 feet at the bay's mouth (Sparks, et. al., 2015).

The greatest decline in coral cover observed on any surveyed reef in Maui was at Honolua Bay. According to the Coral Reef Habitat Assessment for U.S. Marine Protected Areas: State of Hawai'i: NW and Main Hawaiian Islands (NOAA NOS, 2009) coral cover decreased from 42% in 1995 to 9% in 2005 at Honolua Bay. However, invasive algae are relatively scarce in the bay, and the bay has an abundance of herbivorous fish given it is a MLCD where fishing is prohibited. This contrasts with Mā'alaea Bay where herbivore populations are depleted, and the reefs are severely overgrown by algae. In Honolua Bay factors such as increased sedimentation, nutrients, chemical runoff and other forms of pollution have likely driven the decline in coral coverage.

The Coral Reef Assessment and Monitoring Program (CRAMP) sampled the northern and southern reefs of Honolua Bay (Sparks, et. al., 2015). Their method consists of ten randomly chosen 10-meter permanent transects marked by small stainless-steel stakes at both endpoints. Digital stills photographs were taken every half meter perpendicular to the substrate at a height of 0.5 meters along the transect line. Approximately 24 overlapping still photos are acquired and approximately 11 non-overlapping images analyzed with Photo grid 1.0 software, for each 10-meter long transect line. The analysis uses 25 randomly generated points per image with the analysis results calculated for percent benthic coverage.

The coral cover within the reef flats of Honolua Bay substantially declined over the last 15 years according to CRAMP reports (ibid). This decline was, in part, the result of large, periodic, heavy sedimentation events. A significant example was the heavy rainfall event that occurred in January 2005, which resulted in a large sediment plume within the bay. That year coral cover on the bay's south reef declined by more than half per CRAMP findings. Winter swells in this bay normally flush sediment off the reef flats, but with this event the water was relatively calm which allowed sediment to settle out and directly impact the corals on the southern reef flat. Further evidence that this sedimentation event led to the observed coral declines is that nearly all the impacted coral were species that are known to be relatively intolerant to sedimentation stress, such as purple rice coral, *Montipora flabellate,* (ibid.).

A more recent event in May 2015 also deposited substantial sediment and organic material into the bay (ibid.). This occurred approximately two weeks prior to the coral survey conducted by CRAMP in June 2015. The recent slight dip in coral cover found at both the south and north survey sites in 2015 could be the result of that sedimentation incident as well. Large sedimentation events are a common occurrence within Honolua Bay and are therefore the most likely explanation for the overall downward trend in coral cover found within the bay, as well as, the lack of any evidence of coral recovery from earlier events according to CRAMP findings.

High sediment loading, and turbidity have long been a concern in Honolua Bay (PIFSC, 2017). There are no desilting basins in this drainage and past agricultural practices deposited sediments into gulches that may continue to be a contributing factor. Since 1990, the reef at Honolua Bay has experienced a dramatic

(about 75%) decline in live coral cover (ibid.). This decline appears to have been a gradual, step-wise process, rather than the effect of a single runoff event (Dollar and Grigg 2004, Chaston & Oberding 2007 in PIFSC, 2017) and since 2007, benthic composition has remained relatively stable, as reported on page 14 of "*Baseline Assessments for Coral Reef Community Structure and Demographics on West Maui*" (PIFSC, 2017).

The CRAMP methodology differs from some other forms of monitoring the bay, making it somewhat more difficult to determine a cause-effect relationship for coral decline. Nonetheless, high turbidity and sediment deposits in the inner bay have been observed consistently since 1974 (Chaston & Oberding, 2007). Excessive soil erosion and sedimentation events are believed to have caused declines in coral cover, impacted coral recruitment success, and have led to negative long-term impacts on the reefs in the bay (PIFSC, 2017). In addition, human activities are altering the reef's resilience to both natural and anthropogenic stressors. To reduce the decline in coral cover, management efforts should focus on reducing anthropogenic sources of stress (ibid.).

***Honolua Bay Fisheries***

Honolua Stream carries varying amounts of silt into Honolua Bay. As a result, inshore waters of the bay near the remnant boat ramp area are usually very murky. The bottom here consists of small boulders and silt. Visibility improves as one moves further offshore.

Algal growth often overtakes corals in bays with high sediment inputs and low fishing pressure. Silt in the water column blocks sunlight that is needed by corals to photosynthesize. Corals also must expend energy to slough off silt that settles on their exterior mucous membrane. These factors combine to reduce the vitality of the coral and make it more susceptible to disease, bleaching and thermal stress.

The Division of Aquatic Resources (DAR) found a relationship between highly-depleted herbivore stocks such as found in Māʻalaea and an abundance of algae (*acanthophora*), a highly preferred food for grazing fishes. Conversely, no or very limited *acanthophora* growth was found at sites where grazing fishes were abundant such as Honolua Bay (Sparks et. al., 2015). This suggests that grazing pressure might be a more fundamental causal factor to reef decline than sediment and nutrient inputs at some Maui locations. DAR's monitoring found that on Honolua's southern reef, coral coverage dropped from 20% to 10% between 2005 to 2015. From 2003 to 2005, cauliflower coral (*pocilopora*) cover dropped from 15% to less than 5% coverage with no substantial recovery over the next decade (ibid).

DAR's fish surveys in Maui County indicate that herbivore fish stocks are depleted at many of the survey locations. DAR's survey results indicate greater fish biomass in areas closed to fishing (Sparks et. al., 2015). Compared to their controls, two of the fully closed reserves (Honolua- Mokulē'ia MLCD, and Molokini MLCD) had higher total resource fish biomass levels.

For instance, DAR found that parrotfish, which are highly targeted, were found to have significantly higher biomass in all four reserve locations compared to their controls. Apex predators (emperors and jacks) showed a clear trend towards higher biomass levels within all the fully protected reserves at ʻĀhihi-Kīnaʻu NAR, Molokini MLCD, and Honolua MLCD (Sparks et. al., 2015). These differences were significant at the ʻĀhihi-Kīnaʻu NAR and the Molokini MLCD when compared with their respective controls, but the differences were not significant at Honolua MLCD.

Manini (*acanthurus triostegus*) is a key shallow-water grazer and is an important indicator species. Trends in manini abundances from the four-year period (2007 – 2010) versus a more recent period (2012 -2015)

were evaluated by DAR (ibid.). Within Honolua MLCD, schools of 500 manini per hectare were observed during the recent period, which was significantly higher than other sample or comparison sites. In contrast, all the Maui open access sites had manini densities below 250 per hectare except for one location during the same period. DAR determined that there had been real increases in manini at all survey sites, regardless of whether they were open or closed to fishing. However, the largest increases were at sites that already had an abundance of manini, such as the Honolua Bay MLCD.

These patterns suggest that fishing pressure has impacted the abundance and distribution of manini. However, it is important to understand that because manini are schooling fishes, there can be a large degree of variability in biomass estimates, resulting from chance encounters with schools of several hundred fish.

Several resting areas for the threatened green sea turtle (*chelonia mydas*) have been identified on both the north and south reefs. Most turtles observed at Honolua Bay by CRAMP were on the northwestern section of the reef crest just inside of the MLCD boundary.

**Līpoa Point**

Pole fishing is popular along the rocky shoreline from Līpoa Point to Punalau Point. In at least one location, many pole holders have been installed along rocky bluffs and cliffs. Other forms of collection, such as ‘opihi are likely to occur particularly in the tide pools along the base of the cliff line.

*Fish pole holders installed along the edge of a tide pool rocky coastline.*

**Keonehelele‘i Beach**

Pole and cast net fishing would be the primary forms of seaside fishing activity in this area, given the shallow reef flat extending off the sandy beach. Overnight visits with poles erected are considered fishing and not camping, which may also contribute to the appearance of fishing at Keonehelele‘i Beach.

**Information Limitations**

There are no apparent creel or angler surveys, where an individual fisher keeps track of their fishing effort, method, gear, and catch and reports this information for fisheries management purposes. This information might offer insight when compared to fish stocks within the MLCD, or indicate favorable spillover effects from the MLCD.

A decade ago, Chaston & Oberding (2007) identified the following marine ecology information limitations:

1. Comprehensive list of marine invertebrates (surveyed in 1979);
2. Comprehensive data on prevalence and occurrence of coral and fish disease;
3. Marine vertebrate surveys;
4. Comprehensive list of marine macroalgae;
5. Analyses of long-term fish data sets;
6. Cause(s) of coral cover decline;
7. Biological impacts of sedimentation and turbidity;
8. In-water monitoring of recreational impacts on coral reefs;
9. Fluxes of freshwater and nutrients from groundwater versus stream flow;
10. Quantity and quality of stream flow; and
11. Integration of water quality and coral reef monitoring.

Since that time, studies have been prepared to fill the data limitations for Honolua Bay. Information related to the above data limitations remain sparse for most of the other parts of the project area's coastline and nearshore waters.

### 2.2.5.2 Flora

Dega and Pickett in their 2007 Archaeological Inventory Survey identified a variety of plant species that traditionally were used by Hawaiians for customary purposes. Noni (*Morinda citridolia*), `ilima (*Sida fallax*), and pōhuehue [beach morning glory (*Ipomoea imperati*)], served medicinal purposes. Kamani (*Terminalia catappa*) was used for ūūcarving canoes, homes, food bowls and trays (pa kamani). Hau trees (*Hibiscus tiliaceus*) were used for outriggers, medicine and ropes. `A'ali'i (*Dodonaea viscosa*) was traditionally used for making spears. Other plants that they observed were the indigenous kolomona (*Senna gaudichaudii*), niu [coconut palm (*Cocos nucifera*)], mai'a [banana (Musa)], kukui (*Aleurites moluccana*), and milo (*Thespesia populnea*).

Unfortunately, introduced species have out-paced many indigenous plants on the project area. These include: eucalyptus (*Eucalyptus globules*), koa haole (*Leucaena latisiliqua*), African tulip trees (*Spathodea campanulata*), papaya (*Carica papaya*), tamarind (*Tamarindus indica*), ivy gourd (*Coccinia grandis*), java plum (*Syzygium cumini*), hibiscus (*hibiscus sp*.), castor bean (*Ricinus communis*), milkweed, (*Sonchus oleraceus*), sour grass (*Digitaug insulaus*), christmas berry (*Schinus terebinthifolius*), croton (*croton tiglium*), guava (*psidium guajava*), lantana (*lantana camara*), monkey pod (*pithecellobium saman*), night blooming cereus (*Cereus grandiflorus*), pānini (*opuntia ficus-indica*), agave (*Agave*), passion fruit (*Passiflora edulis*), philodendron (*Philodendron scandens*), and pikake (*Jasminum sp*.) (Dega and Pickett, pg. 8).

**Potential Impacts and Management Issues**

Upcountry efforts are being made to protect native plants and ecological functions such as subsurface and groundwater recharge and retention and controlling wild pigs, goats and deer. The West Maui Mountains Watershed Partnership (WMMWP) has constructed nine strategic fences to prevent damage to the native upland forests by feral ungulate and invasive weeds. This joint, public/private partnership

between majority landowners of mauka conservation lands in West Maui intends to restore the watershed through the protection and conservation of the water and other native natural resources.

**Honolua Bay**

Several foot trails from the parking areas along Honoapi'ilani Highway lead to Honolua Bay. The trail from the largest parking area meanders through interesting, thick, forest canopy, along the valley floor adjacent to Honolua Stream. A variety of wild vines and air-plants grow on the larger trees within this forest area. Visitors and tourists frequently post favorable, enthusiastic comments on this "jungle" experience along the 0.6 mile, relatively wide, flat, easy-to-walk trail.

The understory is sparse where the canopy is thick, but some ground level areas are covered by dense haole koa. Monkeypod (*Samanea saman*) is the most common plant, followed by Hawaiian plum (*Eugenia sp*.) and a grove of acacia (*Acacia koa*) by the stream. Other trees include ironwood (*casuarine equisetifolia*), opimua (*pithecellobium dulce*), kukui (*aleruites moluccana*), some eucalyptus and kiawe (*prospois chilensis*).

On the southern slopes of the valley were numerous christmas berry (*schinus terbinthifolius*), as well as ironwood tree (*casuarine equisetifolia*), and kukui tree (*aleruites moluccana*). More centrally, kalamoan (*casia glauca*) was found along the road side.

*Honolua Bay forest canopy.*

On the northern side of the valley are several large mangoes (*magifera indica*), breadfruits (*artocarpus incisus*), guavas (*psidium guajava*), and papayas (*carica papaya*). Several palms including the date palm (*phoenix roebelinii*), Chinese fan palm (*livistona chinensis*), a member of the washintonia family, and coconut trees (sp) were noted by Belt Collins (1979). The northern slopes contained many sisal plants (*agave sisalana*), cacus (*opuntia megacantha*), and night booming cereus (*hylocereus indatus*).

The shore area contained several wili (*erythrina sandwicensis*), milo (*thespesia populnea*), castor beans (*ricinus communis*), a variety of common weeds, and bermuda grass (*cynodon dactylon*).

**Līpoa Point**

In 2007, Hobdy surveyed 12 acres on the northeast edge of Honolua Bay along the cliff line leading to Līpoa Point, where foot trails lead to surf spots. The survey area covered the coastal area rising from sea level, up the coastal bluffs and ridges. He found that vegetation was predominantly non-native and dominated by weedy grasses, shrubs, and trees (Hobdy, 2007). Hobdy recorded a total of 80 plant species with two endemic, nine indigenous, two Polynesian introductions (milo and niu) and 67 non-native species. Among the 22 most common plant species he encountered, only three were native species. None of the species identified were federally endangered or threatened. The steeper bluffs were also dominated by guinea grass, with swollen fingergrass (*chloris barbata*), Chinese violet (*asystasia gangetica*), ʻakulikuli (*sesuvium portulacastrum*), naupaka kahakai (*scaevola taccada*) and milo (*thespesia populnea*) also common. The gentle slopes above the bluffs were covered by a weedy grassland with scattered shrubs and trees. Guinea grass (*panicum maximum*) dominates with koa haole (*leucaena leucocephala*), ironwood (*casuarina equisetifolia*) and panini (*Opuntia ficus-indica*) common. Along the eastern edge of the former pineapple fields, ironwoods and cook pines serve as a wind break.

*Fallow fields above Līpoa Point.*

Hobdy determined that given the diversity of plants and the dramatic landscape they occupy; the area should be considered both a scenic and biological asset. He suggested that trails should be designed to avoid damaging this plant community but be close enough to allow for viewing and some interpretive signage. In addition, any intensive development should be restricted to the flat ridge top (i.e., former agriculture areas) according to his recommendations (Hobdy, 2007).

**Keonehelele'i (Windmills)**

Ironwoods, hale koa and other invasive plants tend to dominate the steep slopes along much of the coastline, and guinea grass and hale koa are common invasive species in more open areas and around gulches. A few cook pines serve as windbreaks on the eastern side of the Līpoa Point plateau.

**Information Limitations**

Existing flora surveys of the eastern-most portion of the project area should be updated while new surveys of un-surveyed areas should be prepared to inform the future management of the project area.

### 2.2.5.3 Fauna

Chaston and Oberding (2007) provide a good synopsis of Hobdy's studies of the area. Hobdy (2007) saw mongoose (*herpestes auropunctatus*) but no rats or mice as would have been expected, perhaps because the vegetation was dense. Avian species observed by Hobdy were limited to seven non-native species during two visits in 2007 including: Common myna (*acridotheres tristis*), zebra dove (*geopelia striata*) gray francolin (*francolinus pondicerianus*), house finch (*carpodacus mexicanus*), red-crested cardinal (*paroaria coronata*), spotted dove (*streptopelia chinensis*), and Japanese white-eye (*zosterops japonica*). These same species are common within the forest of Honolua Bay and wild chickens and feral cats are commonly observed near anthropogenic activities along the shore.

**Potential Impacts and Management Issues**

No endangered or threatened mammal, bird, or insect were observed by Hobdy on the 12 acre portion of the 245 acre project area that he surveyed in 2007. Similarly, no other researchers have identified protected fauna in the area. Hobdy did not observe any indigenous seabirds such as the wedge-tailed shearwater or 'ua'u kani (*Puffinus pacificus*) along the coastal bluffs during his 2007 survey. While these areas may serve as potential ground-nesting habitat for this species, high predation by mongoose would be expected without some form of intervention and control.

Hobdy did identify two small tree tobacco plants on a steep coastal bluff, that could potentially serve as host plants for the endangered Blackburn's sphinx. However, no Blackburn's sphinx moth or their larvae were observed after careful examination (Hobdy, 2007).

**Information Limitations**

Additional surveys of the Līpoa Point and Keonehelele'i coastlines to identify potential nesting habitat for wedge-tailed shearwaters and the efficacy of predator control and intervention could prove useful if future habitat restoration efforts are envisioned for the project area.

Any proposed development or improvements along the coastal bluffs and cliff line should take special care to examine if host plants or the protected Blackburn's sphinx moth species are present.

Existing fauna surveys should be updated, and new surveys should be prepared, to inform future management of the project area.

## 2.2.6 Ecological Protection

### 2.2.6.1 Species Protections

The Hawaiian Islands display substantial species biodiversity arising from its remoteness, multiple micro climates and biomes, diverse topography, range of elevations, precipitation patterns, and its volcanic

origin, among other factors. This biodiversity includes a high percentage of endemic plants and animals earning Hawai‘i the “Endangered Species Capital of the World.”

Over 100 plant taxa are extinct, and over 200 have 50 or fewer individuals remaining in the wild according to the DLNR DOFAW Rare Plant Program website (2017). Additionally, 366 of the Hawaiian plant taxa are listed as endangered or threatened by Federal and State governments, and an additional 48 species are proposed as endangered. Hawai‘i contains 44% of the nation’s endangered and threatened plant species, yet comprises less than 1% of the nation’s land mass (ibid.).

There are numerous protections for plants and animals, whether they be terrestrial, marine, resident or transient. Species protections in Hawai‘i include:

- Protections provided by the Convention on International Trade in Endangered Species (CITES);
- Protections of the International Union for the Conservation of Nature and Natural Resources’ (IUCN) Threatened Red List;
- Species protected by the U.S. Marine Mammal Protection Act;
- The federal list of threatened, endangered, candidate and concern species (USFWS and NOAA); and
- The state list of threatened and endangered species.

In addition, Hawai‘i’s native terrestrial fauna species are listed as “Species of Greatest Conservation Need” (DOFAW, 2015). This afforded broad treatment under Hawai‘i’s Comprehensive Wildlife Conservation Strategy. The strategy provides information on the distribution and abundance of these species, identifies the location and condition of key habitats for these species, and describes the major threats to these species and/or their habitats. The strategy is written from a landscape and island scale down to the species level. It proposes actions to conserve these species and their habitats and recommends methods to monitor the effectiveness of these actions.

#### 2.2.6.2 Humpback Whale National Marine Sanctuary

Maui has a long, storied history of relating to whales. At the turn of the 19th century, Lahaina was the center of whaling operations in which humpback whales were killed and their bodies and oils commoditized. In 1946, the International Convention for the Regulation of Whaling began restricting the take of humpback whales and by 1966, the International Whaling Commission prohibited commercial whaling of humpbacks. In June 1970, humpback whales were designated as "endangered" under the Endangered Species Conservation Act and its subsequent policy replacement, the Federal Endangered Species Act (ESA). This designation afforded humpback whales with a variety of protections and funding for research.

In 1992, the U.S. Congress established the Hawaiian Islands Humpback Whale National Marine Sanctuary. The sanctuary is comanaged between the Federal Office of National Marine Sanctuaries and the State of Hawai‘i DLNR. The sanctuary extends from the shoreline (Figure 10) offshore of Līpoa Point to the 100-fathom isobath (600 ft. depth) and to the eastern tip of Moloka‘i. The Sanctuary encompases the shallow seas between Maui’s four islands. In more recent years, whale watching using tour boats has grown into a multi-million-dollar business in Maui. Lahaina and Mā‘alaea Harbors cater to thousands of tourists from November to April hoping to see, hear and learn about the humpback whales that have migrated here from Alaska. In 1999, revenue attributed to whale-watching activities in Hawai’i was estimated to be between $11 to $16 million dollars.

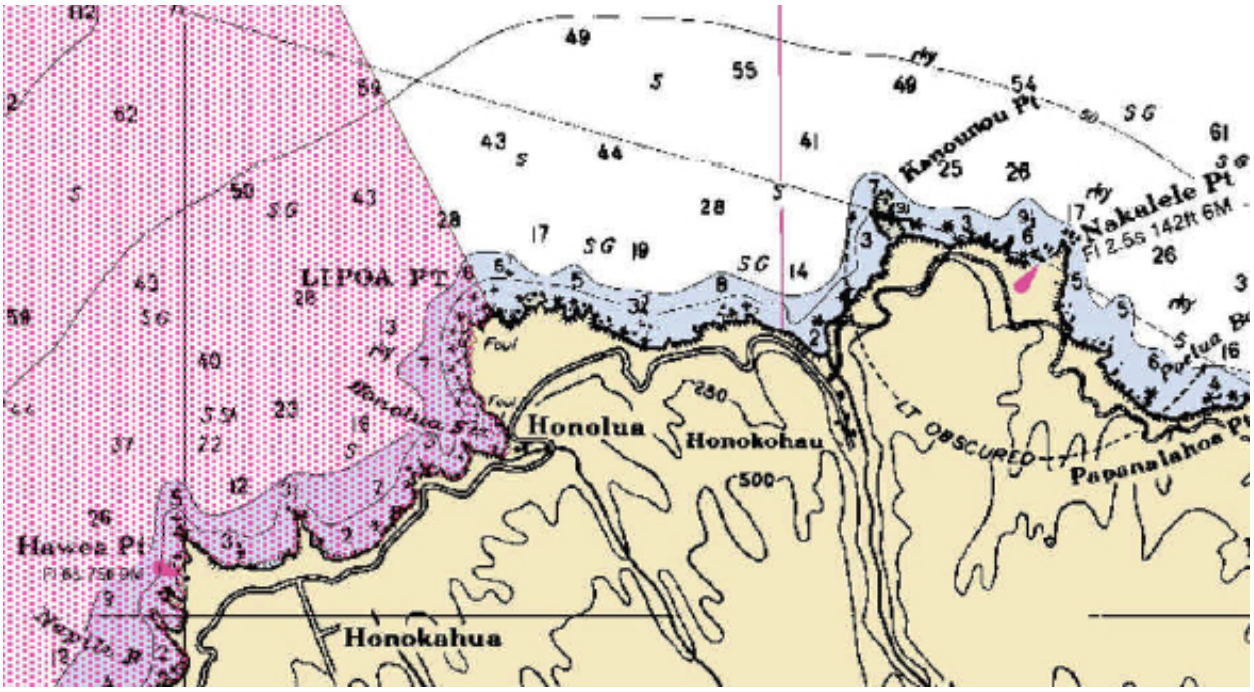



**Figure 10:** Limits of the Humpback Whale Sanctuary (pink) at Līpoa Point.
*Source:* (NOAA, 2017).

**Potential Impacts and Management Issues**

Recent research has determined there are 14 Distinct Population Segments (DPSs) of Humpback Whales in the world. After nearly a half century of protection, Nine of the 14 DPS have sufficiently recovered. On September 8, 2016, these DPS were delisted and are no longer protected as endangered or threatened species under the Federal ESA including Hawai'i's DPS (Federal Register, 2016).

**Species-based Protections**

Despite the delisting from ESA protections, humpback whales are designated as "depleted" under the Marine Mammal Protection Act (MMPA) and afforded some levels of "approach" protection. The MMPA regulations prohibit operating an aircraft within 1,000 feet (approximately 300 meters) of a humpback whale, approaching within 100 yards (approximately 90 meters) of a humpback whale by any means, or causing a vessel, person or other object to approach within 100 yards (approximately 90 meters) of a humpback whale (HIHW NMS, 2017). The regulations prohibit leap frogging where an aircraft, vessel, person, or other object is placed in the path of a humpback whale so that the whale approaches to within the restricted distance. The regulations also prohibit the disruption of normal behavior of a humpback whale. The MMPA regulations apply to the seas within 200 nautical miles (370.4 km) of the Hawaiian Islands.

**Honolua Bay**

Any improvements or activities that could adversely affect humpback whale habitat should be avoided. Consultation with staff at the Hawaiian Islands Humpback Whale National Marine Sanctuary located at 726 South Kīhei Road, Kīhei, Hawai'i 96753, phone: (808) 879-2818 or contacting Allen.tom@noaa.gov by email should be undertaken for specific improvements, where warranted. As the DLNR is a co-manager of the sanctuary, it may also be prudent to engage professional staff at the state agency when considering improvements, research, outreach or education, or other activities.

**Līpoa Point**

Waters east of Līpoa Point are outside of the whale sanctuary, however marine mammal approach rules are the same on either side of Līpoa Point. Waters to the west of the point are within the sanctuary and the agency should be consulted when contemplating improvements that could adversely impact whales or their habitat.

**Keonehelele'i Beach**

Waters offshore are not within the sanctuary; but marine mammal approach rules still apply.

**Information Limitations**

Additional data for the project area's management related to whale protection is not needed.

## 2.3 ARCHAEOLOGICAL RESOURCES

The Dega and Picket 2007 Archaeological Inventory Survey (AIS) of the Līpoa Point project area identified nearly two dozen archaeological sites with most being found along or near the pali (Figure 11). The survey identified twenty-three sites consisting of forty-three individual features on two parcels. No surface or sub-surface features were discovered in any of the active or fallow pineapple fields on either side of Honoapi‘ilani Highway. Most of the identified sites were located along the rugged coastline of the Līpoa Point, and all the documented sites were historically significant under Criterion D. Most of the sites are slated for permanent preservation and no further work was recommended by Dega and Pickett (ibid.).

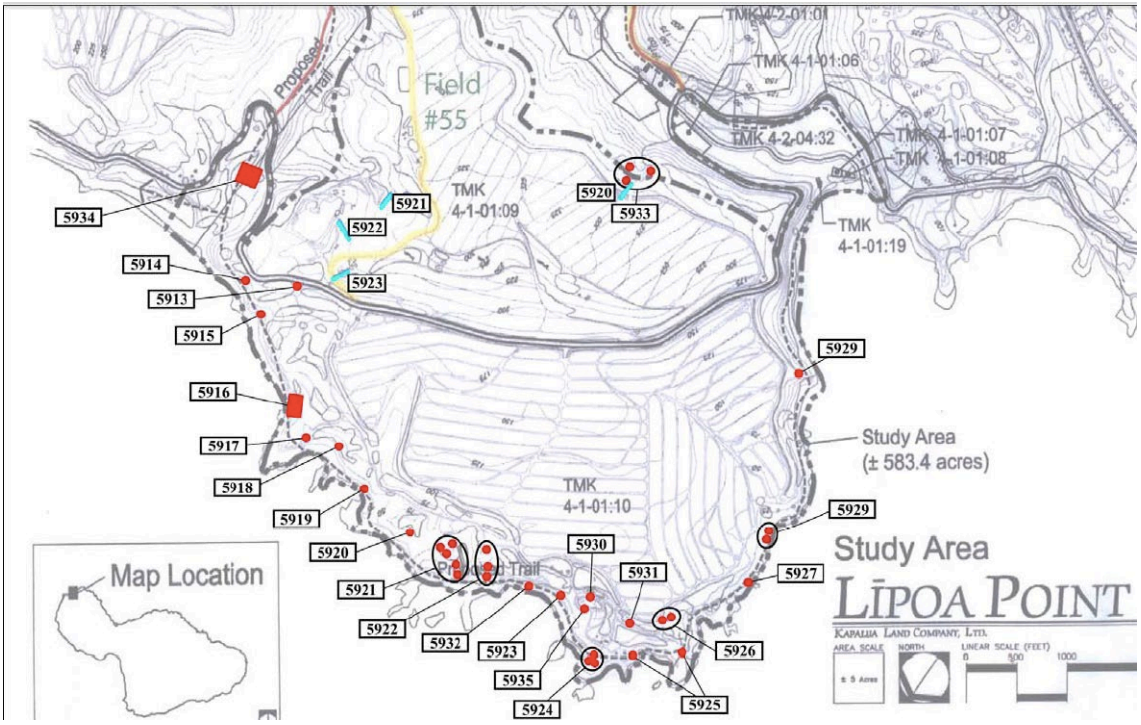



**Figure 11:** Archeological resource sites at Līpoa Point.

As stated in the AIS (Dega and Pickett, 2007):

> “the identified sites relate to traditional pre-contact Hawaiian settlement, historic ranching (50-50-01-5919), and the plantation-era (50-50-01-5926). Seventeen pre-contact sites were identified in the project area. These traditional sites are associated with permanent habitation, temporary habitation, ceremonial activities, agriculture, and transportation. Traditional site types identified during the survey include: permanent habitation enclosures, terraces, and a platform; temporary habitation loci were represented by L-shapes, C-shapes, an overhang or cave, and terraces; agricultural terrace complexes, terraces, and modified outcrops; a ceremonial coral concentration, a water worn cobble and pebble concentration, an upright; and a trail for transportation to the occupation and activity areas. Nine sites were interpreted to be associated with historic habitation, agriculture, ranching, transportation, and ceremonial practices. Two sites were subject to radiocarbon dating. Site-5921 yielded a modern (contaminated) date from a subsurface feature and Site-5932 yielded a Layer I cultural stratum date of A.D. 1660-1960 (2 Sigma), most likely dating late traditional-period of the site.”

In 1974 Kenneth Moore prepared an archaeological survey of approximately 90 acres in Honolua Valley including the floor, walls, and embayment arms of Honolua Valley. During the survey 13 archaeological sites were located, described and mapped (Moore, 1974). "Of the 13 sites, eleven sites appear to be prehistoric (pre-European contact) and two sites date to historic times" (Moore, 1974). In 2007 Dega and Pickett conducted survey sweeps in Honolua Bay proper to locate archaeological features that were previously identified by Moore (Dega and Pickett, 2007). According to Dega and Pickett's 2007 AIS, "all of the required sites were identified intact and in relatively good condition."

**Information Limitations**

An archaeological inventory survey should be prepared for the project area between Keonehelele'i Beach and Honokōhau that wasn't previously surveyed by Dega and Picket in 2007. Furthermore, the 2007 AIS should be updated to reflect current conditions. The updated AIS report should meet the requirements of the State Historic Preservation Division (SHPD) including:

1. A review of previous archaeological work conducted in the general area of the project;
2. Field work, consisting of surface reconnaissance, mapping, and recording of identified surface archaeological features;
3. Limited subsurface testing, if necessary;
4. Laboratory analysis, including the processing of radiocarbon dates, if available; and
5. Production of a report acceptable to the State Historic Preservation Division (SHPD).

A cultural resource survey should also be prepared to identify existing cultural resources (e.g. fishing areas, limu gathering areas, etc.), contemporary traditional practices, and mo`olelo that may be tied to specific landscape features within the project area. The cultural survey should include documentary research for the development of the cultural historical context of Līpoa Point from Hawaiian settlement of the area prior to western contact and into the modern era.

## 2.4 COASTAL HAZARDS

### 2.4.1 Sea Level Rise

The Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, 2007) reported that global sea-level rise (SLR) increased from the 19th to 20th centuries. Considerable debate remains over how much sea levels will rise. However, most scientists agree that sea level rise will accelerate this century and will continue to rise for years to come (Rahmstorf, 2006; Overpeck et al., 2006; IPCC, 2007). Global average sea levels are expected to continue to rise by at least several inches in the next 15 years and by one to four feet by year 2100 (USGCRP, 217). For example, global average sea level has risen by about seven to eight inches since 1900, with almost half (about three inches) of that rise occurring since 1993. The last few years have also seen record-breaking, climate-related weather extremes, the three warmest years on record for the globe, and continued decline in arctic sea ice (ibid.). In general, SLR will occur in a non-linear fashion with small changes at first, but increasingly significant changes over time.

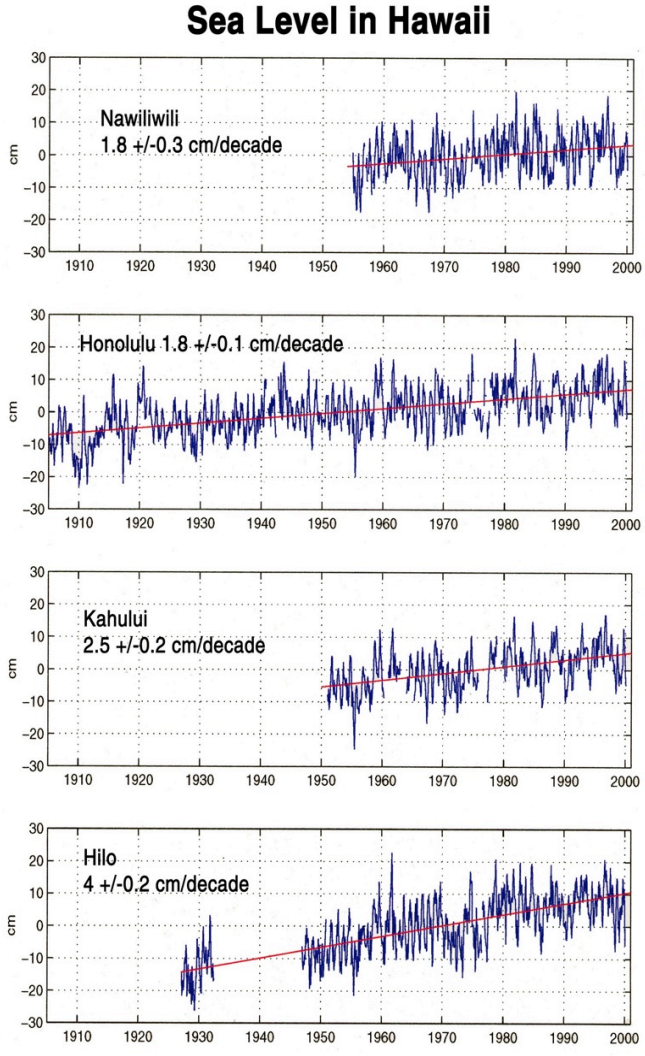



**Figure 12:** Historic tide gauge readings in Hawai'i.
*Source:* Fletcher et al., 2012

The Pacific Ocean is warming, resulting in higher tides, more frequent episodic storm and surge events, more acute episodes of beach erosion, and a trend towards higher rates of chronic coastal erosion. Although the exact amount of SLR is still in question, local scientists anticipate SLR of one meter (3.3 feet) by the end of the century (Norcross et al., 2008) with some estimating a meter of SLR in the Hawaiian Islands as early as year 2050 (Fletcher et al., 2010). Tide gauge measurements provide a historic record of the ocean's level at the Honolulu Harbor and neighboring islands in Hawai'i (Figure 12). The data shows an upward trend in the level of the sea.

In Hawai'i, sea level rise is predominantly the result of thermal expansion, where sea water has warmed and thus has expanded. Riding on the rising water are higher waves, greater storm surge, more powerful hurricanes, and tsunamis that would be able to penetrate further inland (Fletcher, et. al., 2010). Sea level rise will result in accelerated erosion of beaches and more frequent flooding of low-lying coastal areas as salt water inundates the fresh water lens and elevates the water table.

**Potential Impacts and Management Issues**

Overall, Honolua Bay is the most susceptible to changes induced by SLR. Keonehelele'i Beach could also experience impacts to its sandy shore.

**Honolua Bay**

Black volcanic rocks and boulders fringe the coastline of the bay. Foot trails and unimproved paths from Honoapi'ilani cross Honolua Stream along a shallow meander just before reaching the bay. The shoreline of the bay consists mostly of volcanic boulders and rocks, making it somewhat more challenging to traverse than sticking to the center of the bay. Two old pavement tracks lead across the shore and into the water. From here to the mouth of the Honolua Stream, rocks are interspersed with smoother cobbled stone, river rock, and some intermittent black sand.

SLR will tend to immerse this area with seawater more frequently. Rising seawater will tend to inundate the stream mouth and raise the groundwater table thereby impacting access routes across the stream and into the bay's waters. However, these changes will occur slowly, and adaptations can be readily made.

Coral reef vitality could decline with rising sea temperatures and corals could experience more frequent bleaching events and incidents of disease. Warmer sea temperature reduces the pH in the water making it more acidic (ocean acidification). Shellfish and hard corals are composed of calcium carbonate (limestone) which dissolves in acidic waters, making it more difficult for these organisms to grow. Corals accrete calcium carbonate, or limestone, to form an exterior skeleton around symbiotic algae. The algae, in return, provides the coral with food from photosynthesis. This symbiotic relationship requires clean water, low nutrients, and sunlight to be effective and can easily be disturbed. Algae will dominate if there are excess nutrients in the water, such as nitrogen from fertilizer runoff or sewage. Heavy rainstorms can carry excess sediment into the bay where it blocks sunlight in the water column. These brown water events also carry non-point source pollution into the bay. When combined, reduced pH and high nutrient loading have a deleterious multiplicative effect on corals and marine life.

Reef systems adapt very slowly to ecological change and have limited ability tolerate large changes or acute variations in water quality parameters, such as temperature, pH, or suspended sediments. Fish and marine life that rely on reef ecosystems would change in their abundance and the diversity of their assemblages in response to reef decline. The effects of SLR will most likely become apparent by changes in the marine ecosystem (e.g., coral coverage, fisheries assemblages, species diversity). However, it may be difficult to discern or differentiate the effects of SLR from other degrading or deleterious factors. These factors include non-point source pollution, quantity and intensity of brown water events, nutrient loading, chemical introductions such as sunscreen, reduced bio-eroding micro- and macroborers, and reduced numbers and sizes of grazing fish.

SLR cannot be prevented in the bay, but the bay's benthic and marine life can be made more resilient to the effects of SLR through water quality improvements. Accordingly, management and monitoring of the effects of SLR are more thoroughly addressed in the section on Water Quality of this report.

**Līpoa Point**

Effects of SLR on the Līpoa Point project area will be negligible and will likely be difficult to accurately gauge or discern. Fortunately, most elements of the built environment such as roads, storm drains and catch basins are predominantly located inland and well above areas susceptible to SLR inundation. There are a few sandy shore spots and very small beaches below parts of the cliff line that lead to and around the point. These will likely become narrower and eventually lost as waves ride on higher waters and crest

over nearshore reef flats and obstructions. In many cases, the sandy shore cannot retreat inland because it is backed by hard, volcanic sea cliffs. Over time, these beaches will wash away and disappear. Incremental adjustments to the footpaths leading to the shore, surf and marine waters may change over time as a result.

SLR could also change the way waves form and where they break over time. These changes would be imperceptable to all but perhaps the most experienced old-time surfers who are accustomed to the waves at Līpoa Point and along the cliff line edging Honolua Bay. Wave formation, its energy and peak are highly variable and dependent on many factors including seasonality.

Tidepools along the rocky shoreline and within the lava formations that extend into the ocean will change with SLR. Some will become inundated more often during low tides, whereas others may form from higher tides that create new tide pools. Large waves will reach further inland and up higher along cliff lines. The dangers associated with tide-pool swimming and hiking or fishing along lava shelfs and platforms may also increase.

**Keonehelele'i Beach**

Keonehelele'i Beach consists of a sandy, coralline-based beach backed by a higher, clay embankment surrounded by ironwood trees and make-shift campsites. There are no sand dunes, however sediment is transported from the gulch at the end of the beach to the nearshore area. The beach is well protected by a wide shallow set of pools created by a nearshore reef flat that breaks incoming wave energy. These features combine to make for a pleasant bathing experience under most circumstances. However, over time, incoming waves will ride higher on rising seas, allowing energetic waves to extend further inland, over the shallows, onto the beach and up to the embankment. The beach would be expected to narrow, and the embankment would become steeper as storm waves erode the shoreline area because of SLR.

Impacts from storm surge will likely become more apparent over time. For example, trees along the edge of the embankment will tilt and topple as their roots become undercut and exposed by erosion. Seasonal and post-storm monitoring by an arborist could identify trees, particularly tall ones, that have been compromised and should be removed for public safety purposes. Replacing ironwood trees with beach heliotrope or other climate-adapted species may improve the area's resilience to SLR.

**Information Limitations**

No studies have been conducted to ascertain the erosion patterns at Keonehelele'i Beach. Because the area was undeveloped, it was not included in 2003 maps of the Maui County Shoreline Atlas. When the atlas is updated, an annual erosion hazard map should be prepared for Keonehelele'i Beach.

### 2.4.2 Tsunami Hazard

Tsunamis can result from geologic events that occur far away from the area. A tsunami (Japanese for "harbor waves") is a series of ocean waves produced by a sudden rise or fall in the earth's crust, most commonly caused by an earthquake or underwater landslide. In the open ocean tsunami waves cannot be seen or felt by ships or airplanes because the unbreaking waves are hundreds of miles wide with a

height of only a few feet. But as the waves approach the coast their height increases dramatically and can be very destructive when they reach the shore (Coastal Services Center, 2010).

The Hawaiian Islands are vulnerable to localized and Pacific-wide tsunamis. Localized tsunamis can result from landslides or subterranean activity of the Kilauea volcano on the Island of Hawai'i. Distant earthquakes, volcanism or landslides in places like Chile, Alaska, and Japan can also generate a tsunami. The first wave of a locally-generated tsunami would reach Maui shores in less than 30 minutes, whereas Pacific Rim perturbations take several hours to reach Hawai'i's shores providing some time for notification and evacuation (Figures 13 & 14).

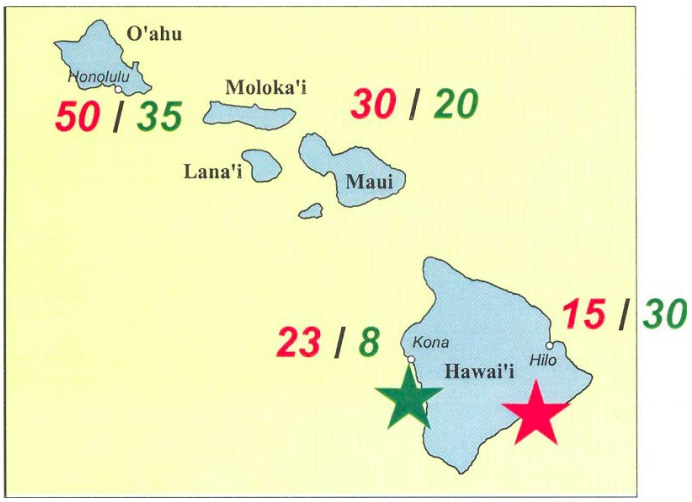



**Figure 13**: Minutes before a tsunami from the east rift zone makes landfall.

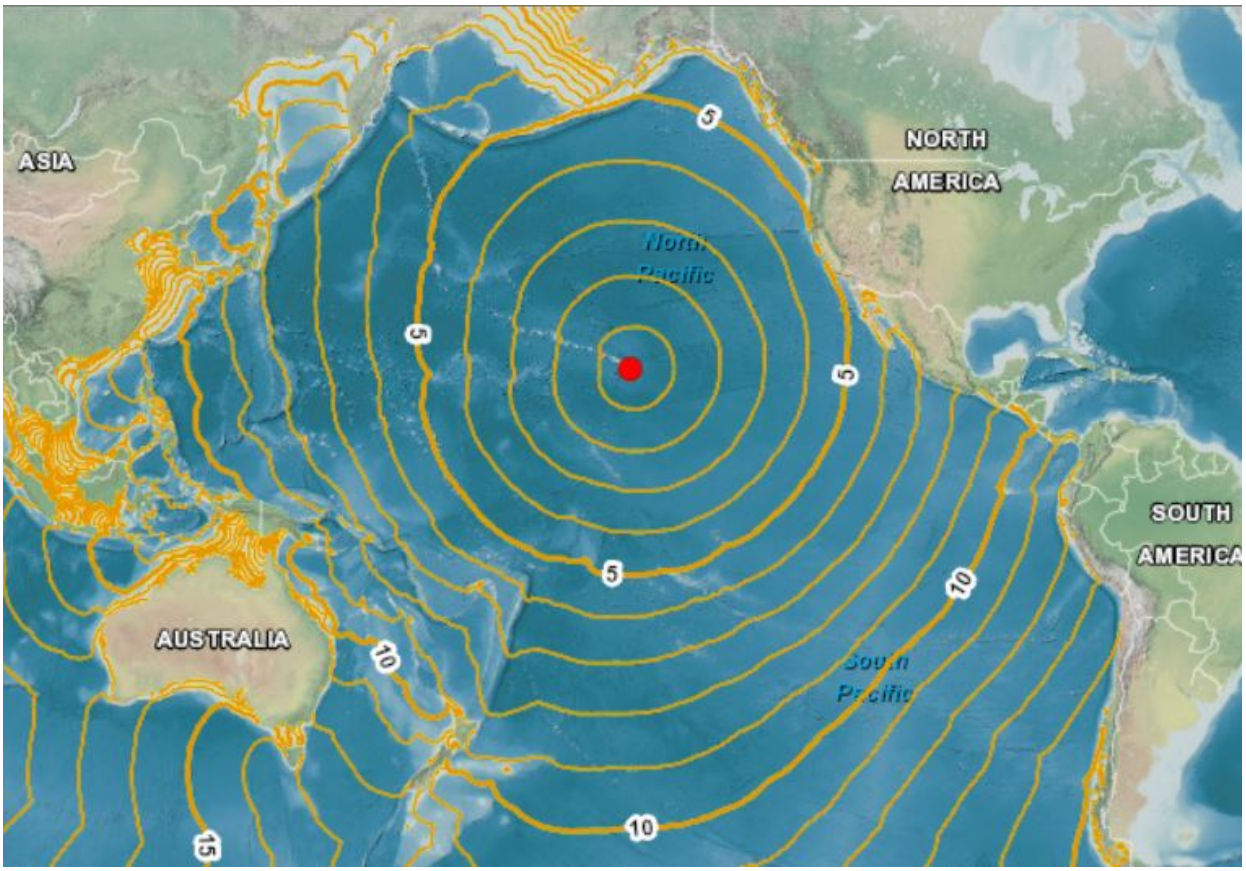



**Figure 14:** Tsunami travel times from distant shores in hours.
*Source*: PDC, 2012.

On April 1, 1946, a Pacific-wide tsunami was caused by a magnitude 7.3 earthquake near Unimak Island, Alaska. The first waves from the 1946 earthquake arrived in Hawai‘i in less than 5 hours and caused extensive damage (PDC, 2012). Wave heights across the Islands reached an estimated maximum of 55 feet, 36 feet and 33 feet on Hawai'i, O‘ahu, and Maui, respectively. Waves also reached a half a mile inland in some locations. A total of 159 people died because of the tsunami in Hawai‘i, of which 96 were in Hilo where the city`s entire waterfront was destroyed.

In 1960, an earthquake in Chile produced a tsunami that killed 61 and injured 282 people, primarily in Hilo (PDC, 2012). As a result of these dangers, the Hawai‘i State Emergency Alert System was established and is used to notify the public of a possible approaching tsunami, including a system of sirens in vulnerable coastal areas.

On March 11, 2011, a 9.0 magnitude earthquake off the Japanese coast of Tohoku resulted in a tsunami that killed more than 15,000 people in the Pacific and leveled incredible damage (PDC, 2012). In Hawai‘i, there was no loss of life or significant project area damages given evacuations. But the power of tsunami inundation and its aftermath was clearly visible throughout many parts of Maui (Figure 15).

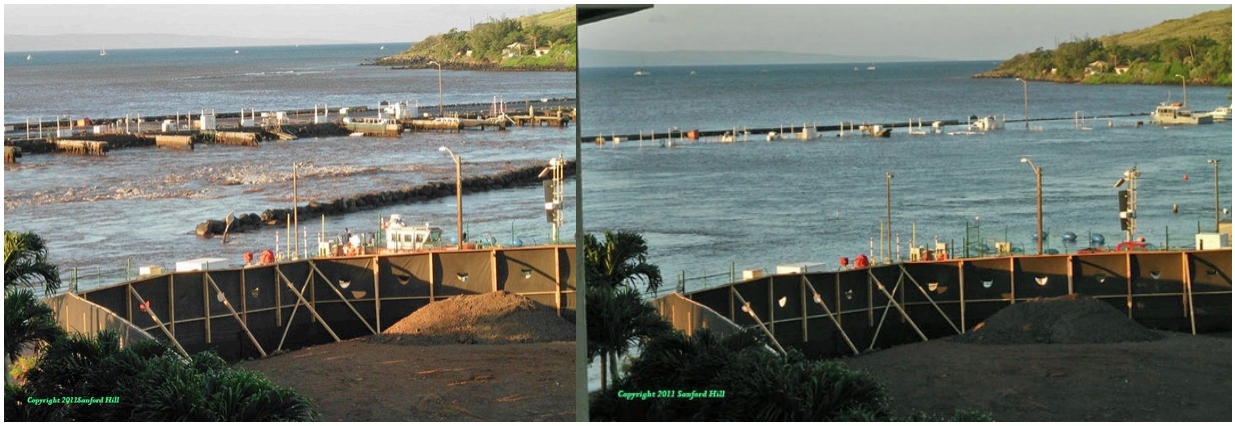



**Figure 15**: Mā‘alaea Harbor 2011 tsunami recession (left) and inundation (right).
*Source:* Sanford Hill / Pacific Disaster Center

**Potential Impacts and Management Issues**

Tsunami inundation heights are difficult to predict with accuracy. Virtually all the coastline coastal area of Līpoa Point is within the tsunami evacuation zone. Figure 16 illustrates the evacuation zone in red and the extreme tsunami evacuation zone in yellow. However, the evacuation zones not only relate to potential inundation but also to the nearest evacuation routes that could be used by car or on foot. As such, the zones often follow the nearest coastal roadway available for escape such as Honoapi‘ilani Highway (i.e., Route 30). The plateau inland of Līpoa Point and the fallow fields around it are elevated and offer refuge above potential inundation areas. There are no tsunami warning sirens or evacuation route signs in the area and the closest sirens is at D.T. Fleming Park about two miles away.

**Honolua Bay**

The low-lying area of Honolua Bay is at much higher risk of being inundated by a tsunami than Līpoa Point given the area’s low elevation and gulch-like topography. A tsunami could easily accumulate waters and push them well into the valley. Several houses and residences are located within the gulch inland of the roadway and are susceptible to damage. Any structures proposed to be located makai of the Honoapi‘ilani Highway would be at high risk of damage. The roadway is susceptible to damage from inundation or could

be blocked by debris dislodged by the force of a tsunami, especially at the two narrow curves including the one-way bridge at the back of the project area. Evacuation signs should account for the differences in evacuation routes (Kapalua direction versus Wailuku direction).

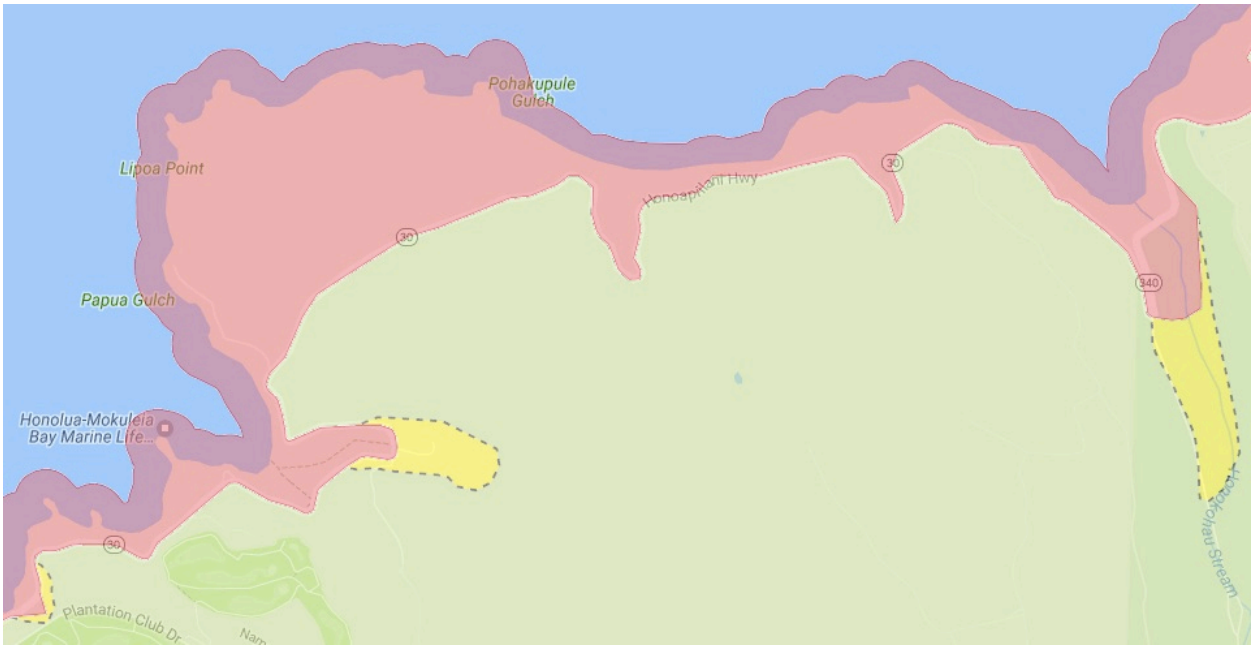



**Figure 16:** Tsunami evacuation zone (red) and extreme tsunami evacuation zones (yellow).
*Source:* http://tsunami.csc.noaa.gov/

**Līpoa Point**

For the most part, much of the Līpoa Point's land mass is elevated well above the actual tsunami inundation zone. About half of the parcel consists of fallow pineapple fields located at elevations ranging from 80 to 188 feet above sea level. The dirt track around Līpoa Point itself is located approximately 135 feet above sea level and is likely to be quite safe.

**Keonehelele'i Beach**

The low-lying areas of the Keonehelele'i coastline and Keonehelele'i Beach are at much higher risk of being inundated by a tsunami than Līpoa Point given the area's topography. In many places, the coastline is backed by steep cliffs making escape unlikely. The campsites along the coastline at Keonehelele'i Beach could readily be inundated given they are only about 8 or 12 feet higher in elevation than nearshore waters.

Signage should alert campers and beachgoers to move uphill to the highway in case of a tsunami or earthquake. Signs should increase awareness that the highway may be blocked or impassible due to landslides or rock falls. Evacuation signs should encourage remaining on high ground or account for the differences in evacuation routes given the narrowness of the roadway in the Wailuku direction and the one-lane bridge in the Kapalua direction.

**Honokōhau**

Tsunami heights could be higher in the valley due to the channeling or converging effect of Honokōhau Bay. The bridge crossing Honokōhau Stream is highly susceptible to damage from inundation and the roadway could easily be blocked by debris dislodged by the force of a tsunami. Access into or out of the

Honokōhau valley could readily be constrained by rock falls or landslides along the steep slopes above the narrow roadway. Anyone considering evacuating should be aware of the potential for being cutoff due to the roadway's closure or impassibility. Evacuation signs should account for the differences in evacuation routes (Kapalua direction versus Wailuku direction).

**Information Limitations**

Signs in low lying areas of the project area should direct evacuations to the higher elevation of the highway and fallow fields located above Līpoa Point. Signs near Honolua Bay should indicate what direction on the highway is a preferred evacuation route. Presently, there are no apparent signs at Keonehelele'i Beach or its campsites. Signs should be provided to lead tourists and visitors away from the Honokōhau area and deter them from driving east towards Wailuku given the roadway's limited capacity. Most of the project area is believed to be out of the audible range of a tsunami warning siren, however verification at key points may be useful.

### 2.4.3 Hurricane Hazards

Hurricane Hiki in 1950 was the first hurricane officially recorded in the State of Hawai'i (PDC, 2012). Since then, several hurricanes have travelled through Hawai'i's waters (Figure 17). Hurricane Iwa (1982) and Iniki (1992) destroyed numerous buildings in Kaua'i. More recently, Hurricane Flossie (2013) and Iselle (2014) caused considerable damage to homes and buildings on the Big Island in the Pahoa region.

Coastal geologists and scientists anticipate an increase in the frequency and power of coastal storms and hurricanes that enter Hawaiian waters due to various factors including climate change, sea level rise, and warming oceans. Hurricanes also bring high winds that can displace loose materials or debris, which in turn can become flying hazards that damage buildings and stationary objects.

**Potential Impacts and Management Issues**

Currently, there are no known above ground structures on the project area that are at risk of destruction from hurricane force winds. Nearby properties do have enclosures that could be impacted by high winds, such as private dwellings, portable buildings and some trailered enclosures.

The Hawai'i Emergency Alert System provides notifications of storms and hurricanes through social media, television, radio, and phone. A hurricane "watch" is normally posted four days in advance of landfall, whereas a hurricane "warning" is normally posted three days before landfall. This allows time for people to prepare for a storm event such as erecting storm shutters, covering windows, sand bagging entryways, stocking up on food, water and power sources, and storing lawn or Lāna'i furniture or other items that could become airborne debris. While long-term campers may be caught by surprise, most residents would probably be aware of the impending storm.

Inclement weather conditions are likely to deter visitors and tourists from recreational activities at Honolua Bay and Keonehelele'i Beach. However, hurricanes can generate large waves in advance of the storm. This may attract surfers and spectators to Līpoa Point.

Structures within the project area have a high probability of being exposed to or damaged by rain, wind, rising waters, wave action, storm surge, or their combination during a major hurricane or storm event. Maui County Code requires elevating structures in flood zones and using preventative construction methods such as hurricane clips, continuous load paths, and waterproofing of utilities. As such, it is

recommended that a building permit and/or flood development permit be obtained from Maui County prior to constructing any new enclosures.


**Figure 17:** History of hurricane tracks in Hawaiian waters.
*Source:* https://coast.noaa.gov/hurricanes/

**Honolua Bay**

There are several tents and informal structures on private land located just inland of the shoreline area. However, there are no permanent structures susceptible to hurricane damage on the public-owned project area. Three port-a-potties located next to the gravel parking area at Honoapiʻilani are anchored with spikes to resist flotation. But they could be replaced if damaged by a hurricane.

There are several residences on private land near Honolua Stream mauka of the highway. Fortunately, the residents can evacuate to the safety of higher ground at nearby developed areas such as Kapalua or use county shelters in the Nāpili or Lahaina area to ride out a hurricane.

Road closures near Honolua Bay are less likely than road closures to the east using routes through Honokōhau towards Wailuku along Honoapiʻilani Highway. However, the combination of rain-induced flooding, stream flooding, and coastal waves pushing water up and over the shoreline could prevent evacuation using Honoapiʻilani Highway in either direction. In particular, the narrow bridge over Honolua Stream is susceptible to floodwaters, debris, and being blocked or hazardous to drive across if water is flowing across the bridge or roadway.

**Līpoa Point**

Effects of a hurricane on Līpoa Point would primarily be related to wind and rain damage. There are no above ground buildings in this part of the project area and damage from a hurricane would be minimal. If future improvements are contemplated, they should be built to withstand exposure to hurricane force winds and excessive rainfall.

**Keonehelele'i Beach**

Keonehelele'i Beach is very susceptible to impacts from a hurricane. Its beaches are likely to erode, its access driveway is likely to be impassible, and escape routes are likely to be blocked by landslides and rock falls, especially to the east (Wailuku direction) where the road narrows, curves inland, and is bounded by sheer cliff sides. Given the heavy rains that come with a hurricane, the risk of landslides or boulders falling on the road would be high. A hurricane could scour much of the sandy beach away and pull this material offshore beyond the shallow nearshore reef shelf. However, it is possible the sand would eventually be returned by normal seasonal wave action and currents. Anyone camping in the area would be at high risk of injury or being trapped by flood waters and should leave the area immediately.

**Information Limitations**

Signs should inform campers, tourists and visitors of the risks of coastal flooding and the best escape and evacuation routes given road capacity and topography. Signs should direct emergency evacuations to the higher elevation of the plateau around Līpoa Point, and/or to the developed areas of Kapalua, Nāpili, Lahaina and West Maui when time permits. Evacuation signs should account for the differences in evacuation routes (Kapalua direction versus Wailuku direction).

### 2.4.4 Flood Hazards

The Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) Community Panels #150003 0258F, 0259F, 0266F effective September 19th, 2012, and 0267E effective September 25, 2009 are applicable to the project area. The FIRM was indexed November 4, 2015. Most of the project area is outside, inland or located above the flood inundation zone (Figure 18). Some areas of the parcel are within the V or VE zone which involve flooding with wave action and velocity hazard. Gulches and low-lying portions of the watershed such as streams are within the A, AE or AH zone and could have ponding or rising of flood waters that exceed their embankments in waters 1 to 3 feet in depth. Much of the highlands and former agricultural fields are within the X flood zone, an area of minimal risk of flooding.

Flooding is likely to increase in depth and intensity given the effects of SLR and climate change. Fortunately, most of the project area is elevated above flood inundation zones. However, several popular areas such as Honolua Bay and Keonehelele'i Beach are susceptible to flooding, and these areas will probably experience deeper and wider flooding in the future.

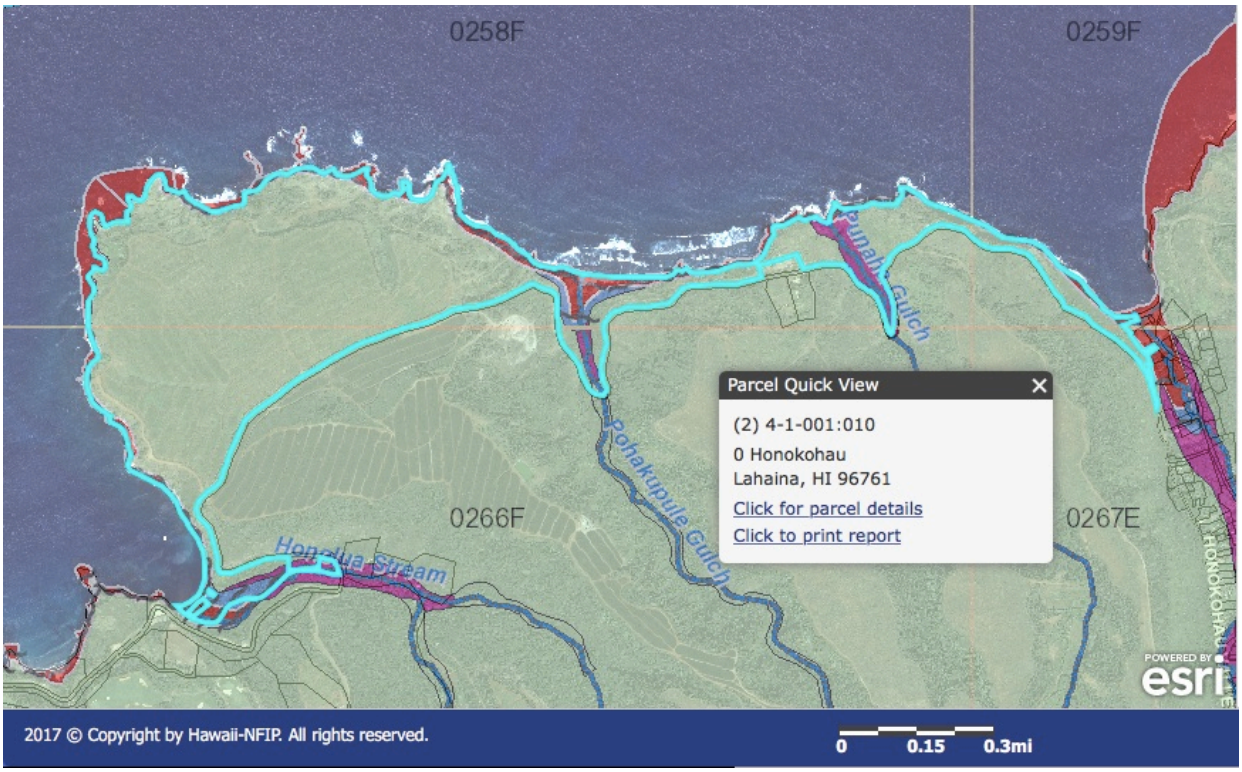



**Figure 18:** Flood hazard zones on the subject project area.
*Source:* http://gis.Hawai'infip.org/FHAT/report/FHAT_Report.pdf

**Potential Impacts and Management Issues**

Should any above ground structures be contemplated in the future, an elevation certificate should be obtained to evaluate the structure's relationship to predicted flood depths and types of inundation (i.e., rising waters versus wave action). Any new structures should be located to avoid flood hazard areas. Any structure in or near a flood hazard zone should be designed to withstand flood inundation and designed to comply with guidelines provided by FEMA for building in areas subject to flooding.

The Maui County Planning Department's Zoning and Administrative Enforcement Division (ZAED) regulates construction within special flood hazard areas (SFHAs). An SFHA represents the 1% annual chance flood (100-year), also known as the base flood. It is the flood that has a 1% chance of being equaled or exceeded in any given year. The Base Flood Elevation or BFE is the water surface elevation of the 1% annual chance flood.

To build structures or conduct certain ground altering activities such as grading that could change drainage patterns, a Flood Development Permit (FDP) may be required from ZAED. Maui County Code (MCC) 19.62 spells out the rules and requirements for work in flood prone areas.

However, state lands within the conservation district are not subject to county zoning pursuant to HRS 205-5. Thus, the requirements of MCC 19.62 regarding avoidance of flood prone areas or additional standards for construction in such areas, are not applicable within a major portion of the Līpoa Point project area. The most flood prone areas of the project area include Honolua Bay, the base of Līpoa Point's cliff line, Pōhakupule Gulch and Keonehelele'i Beach, Punaha gulches and Honokōhau Stream. These areas are within the State Conservation District. Construction and development activities in these flood prone

areas are not required to obtain an FDP nor an evaluation by ZAED of how the structure would be impacted by flooding.

An applicant may request *courtesy* site plan review and design recommendations from Maui County relative to flood hazard avoidance guidelines. Normally ZAED reviews site plans and FDP requests as part of the county's customary special management area, building permit or grading permit process and procedures. However, an FDP can be a stand-alone permit which may be requested directly from ZAED on forms provided by the agency. A completed Zoning and Flood Confirmation Form signed by ZAED is also normally required before other County permits, such as special management area or shoreline approvals are granted.

ZAED does not require an FDP for work in an X flood hazard zone given it is an area of minimal flooding (Figure 18). In contrast, construction or grading activities in SFHAs such as the V, VE, A, AE flood hazard zones would normally trigger FDP review from ZAED. SFHAs designated as V or VE are coastal flood zones with velocity hazard (i.e., wave action). These areas may be inundated with flood waters that have the force of waves behind them. Therefore, buildings should be elevated at least one foot (freeboard) above base flood elevation to allow water to flow underneath the structure unimpeded. Post and piers should be used to elevate the building and should be securely anchored and strong enough to withstand wave action. Slab on grade construction should be discouraged and mounded sand or aggregate to elevate a building pad above BFE is not allowed since the pad could be eroded away by wave action.

In A and AE flood hazard zones, flooding results from rising waters such as streams overflowing their embankments or where upcountry gulches discharge into coastal inlets. Buildings should be designed to withstand hydrostatic forces such as pressure on the exterior walls from rising water. One mitigation method is to have regular gaps in a building's foundation walls to allow water levels to equalize. Structures should be anchored to resist floatation. Boundary or barrier walls should be oriented to not inadvertently redirect flood waters to adjacent or downstream properties or erosion-prone areas. Obstructions within a streamway should be avoided so as to not snag tree limbs, branches, or other floatable materials that could form an obstruction to stream flow which could increase or redirect flooding or dam a stream. Utilities should be water proofed and/or located above predicted flood levels to help improve safety and reduce potential damages or restoration costs associated with a flood.

Over time, avoiding construction within flood prone areas, or elevating buildings and utilities above flood waters makes economic sense and improves public safety. Any building or infrastructure improvements should account for sea level rise and higher than predicted flood inundation, as well as reductions in stream flow and storm water discharge as water tables rise.

A closer inspection of flood prone areas within the project area is important to long-term development or maintenance of the project area. Within the project area, at least four fresh water streams discharge into the ocean intermittently. Heavy rains upcountry flowing downhill through streams and gulches can collide with waves and seawater and be pushed inland by storm surge to exacerbate flooding in stream mouths, bays, and low-lying areas. The combined forces of upcountry runoff and ocean storm surge can increase dangers from flood risks to visitors and users of the project area substantially. Areas that expose humans to flood risk primarily consist of Honolua Bay, Pōhakupule Gulch and Keonehelele'i Beach, Punaha Gulch and Honokōhau Stream.

Honolua Bay

The embayment has flood risks from both upcountry storm water and incoming wave action (Figure 19). Coastal flooding ranges from 19 feet deep at the mouth of the embayment to 16 feet deep near the back of the project area where it meets Route 30, the main roadway. Given the depth, force, and extent of potential flood water inundation, portable restrooms should be located above and away from streams and areas subject to wave action. Portable toilets should also be anchored to resist flotation, dislodgement, or relocation into marine waters. Currently, three portable toilets are located adjacent to Honoapi‘ilani Highway on its eastern most mauka side and are spiked, but not in a fashion that would prevent floatation from rising waters. Flood forces should be considered when installing signs, educational placards, picnic tables, or any other infrastructure. Construction with nuts and bolts should be favored over nails given the high potential for dislocation into the bay.

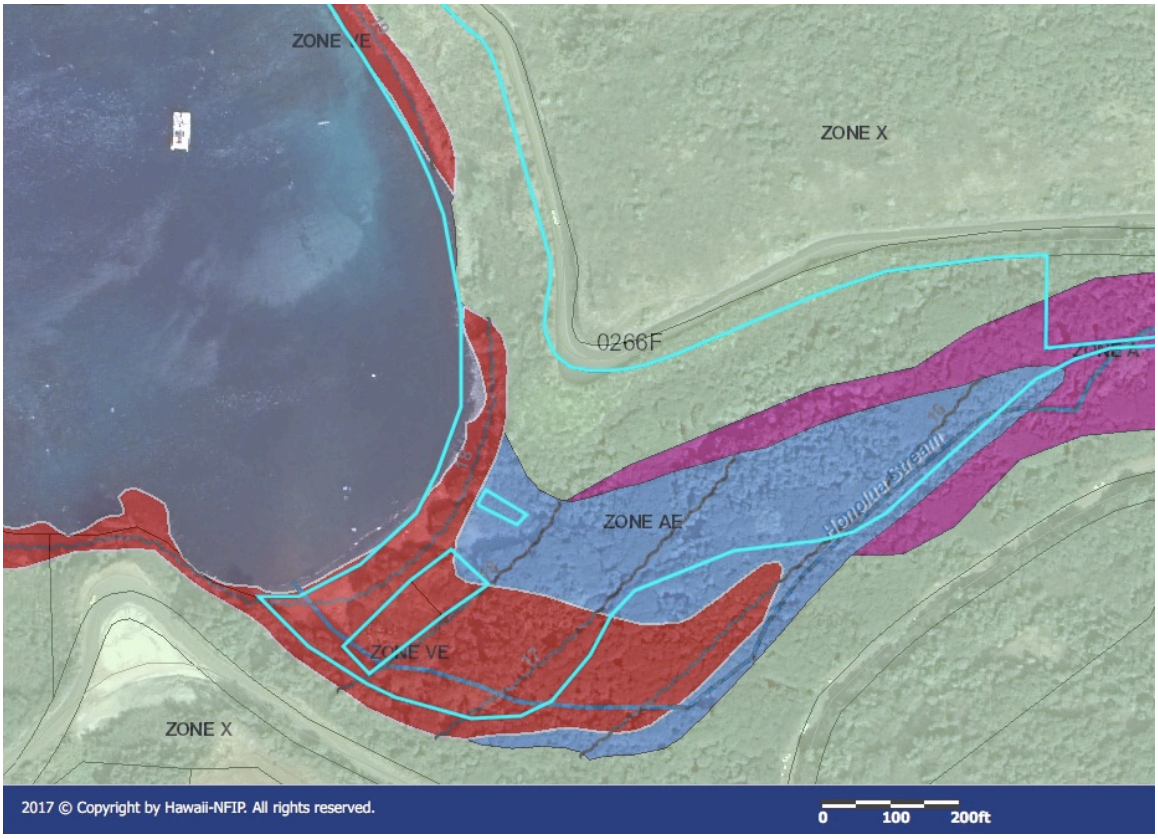



**Figure 19:** Honolua Stream and gulch flood zones.

**Līpoa Point**

There would be minimal adverse effects from flooding for portions of the project area near Līpoa Point as it is elevated well above any flood zone. The base of the cliff line is within the VE zone but is not an area suitable for development.

**Keonehelele‘i Beach**

Flooding may occur in Pōhakupule Gulch and stream at Keonehelele‘i Beach. Keonehelele‘i Beach caters to camping and overnight visitation by providing trash receptacles, hand-built fire circles, and flat areas adjacent to and above the beach that offer good camp sites, vehicle parking, and shade provided by mature ironwood trees.

Access to the area is via a rough, bumpy, dirt driveway that turns sharply off Honoapi‘ilani Highway. A wide paved shoulder at the entrance to the driveway serves as a parking area for those preferring to walk down the short driveway to the campsites and beach.

The dirt driveway extends downslope to a flat area just inland of the beach. The Pōhakupule Gulch and Stream are close to the west side of the dirt driveway making the driveway susceptible to flood inundation and potentially impassible to vehicles after a heavy storm. Flood waters at the stream’s mouth are predicted to be 21 feet deep, as indicated by the wavy silver line on Figure 20.

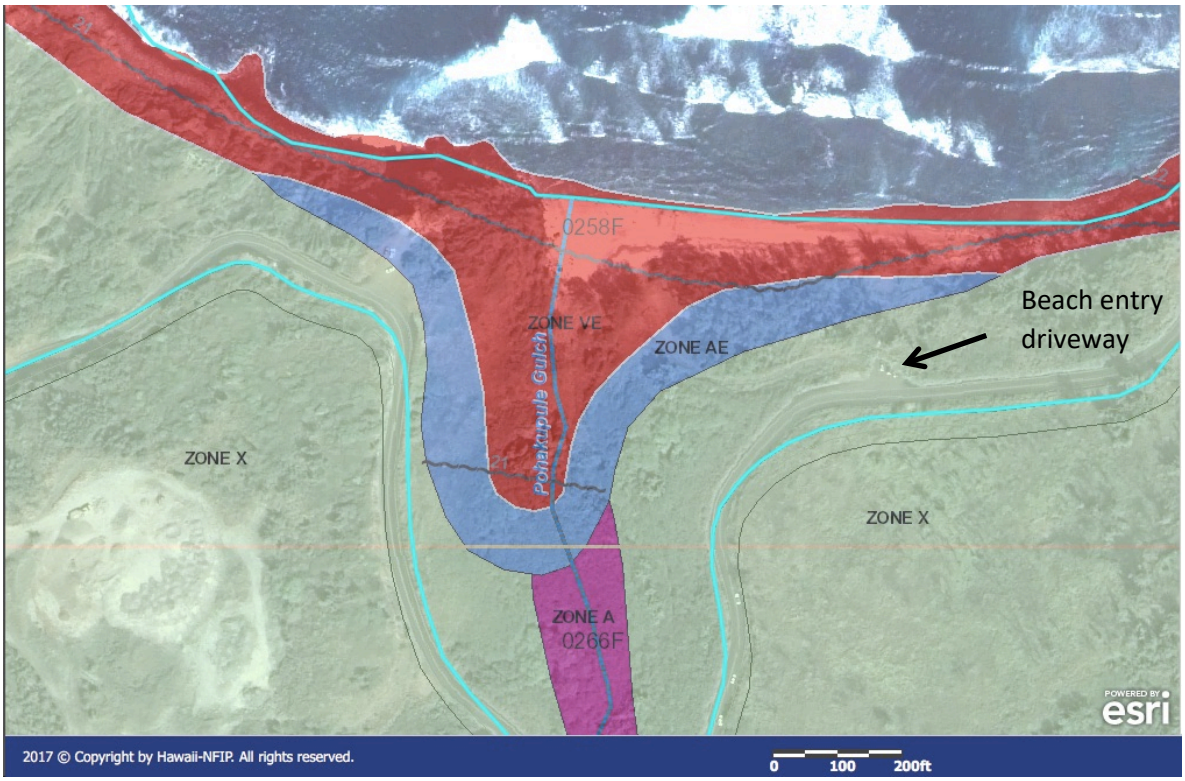



**Figure 20**: Pōhakupule stream and gulch flood zones.

The adjacent Keonehelele‘i Beach risks flooding from both incoming waves and downhill stream flow that exceeds the gulch’s embankments.

Any site improvements should direct camping away from coastal flood inundation areas and to higher elevations. Locating rustic camp sites along higher portions of the small plateau and away from, and inland of, the edge of the existing embankment may be prudent given erosion trends. Reorienting vehicles away from low-lying portions of the dirt driveway could be accomplished by placing large stones or tree trunks to block vehicles from the area. Vehicles entry to the beach should also be blocked by natural impediments to help maintain sensitive coastal plants that prevent the loss of sand from wind. Campers could be caught off guard during storms and their escape route cutoff due to the dirt driveway becoming flooded, muddy or impassible.

**Honokōhau**

To the east of Keonehelele‘i and prior to reaching Honokōhau is Punaha Gulch. The gulch leads to the ocean allowing for stream discharge during heavy rains. The gulch risks flooding from both incoming

waves and downhill stream flow that exceeds the gulch's embankments. Flood waters are predicted to be 21 feet deep, as indicated by the wavy silver line in Figure 21.

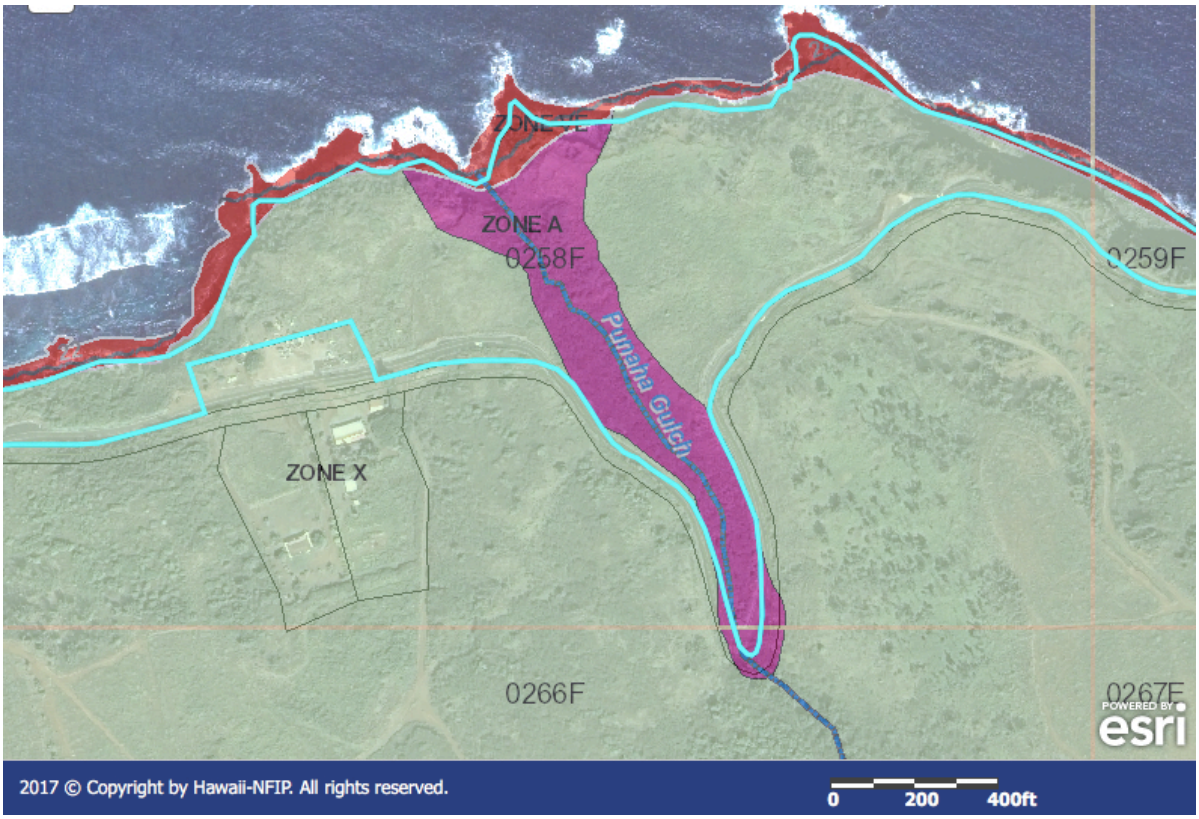



**Figure 21:** Punaha Gulch flood zones.

To the east of Punaha Gulch the Honoapi'ilani Highway (Route 30) that borders the project area turns into the Kahekili Highway (HI-340). The roadway changes names and jurisdictions (county to state) at the most inland, mauka extent of a curve in the roadway just west of the bridge over the Honokōhau Stream (approximate milepost 36).

This portion of the road is very narrow and is bordered by a sheer embankment that rises above the roadway from which rocks and soils can be dislodged and hinder safe vehicle passage. For these reasons, the Honokōhau portion of the project area should be considered dangerous during large storms.

Much of this portion of the Līpoa Point project area is steep and inaccessible. It is bordered by the roadway (mauka) and the Honokōhau Stream (makai). If any improvements are envisioned, they should account for the significant depth of predicted storm surge in and around the stream. Plans should also account for the likelihood that the bridge over Honokōhau Stream could become impassible from flooding or debris limiting escape or evacuation to higher areas.

Honokōhau Stream risks flooding from incoming waves predicted to reach 26 feet deep near the mouth of the bay (Figure 22). Most of the land within the flood zone is minimally developed. However, a dwelling sits on an elevated embankment on the eastern side of the stream on private property that is adjacent to the Līpoa Point parcel.

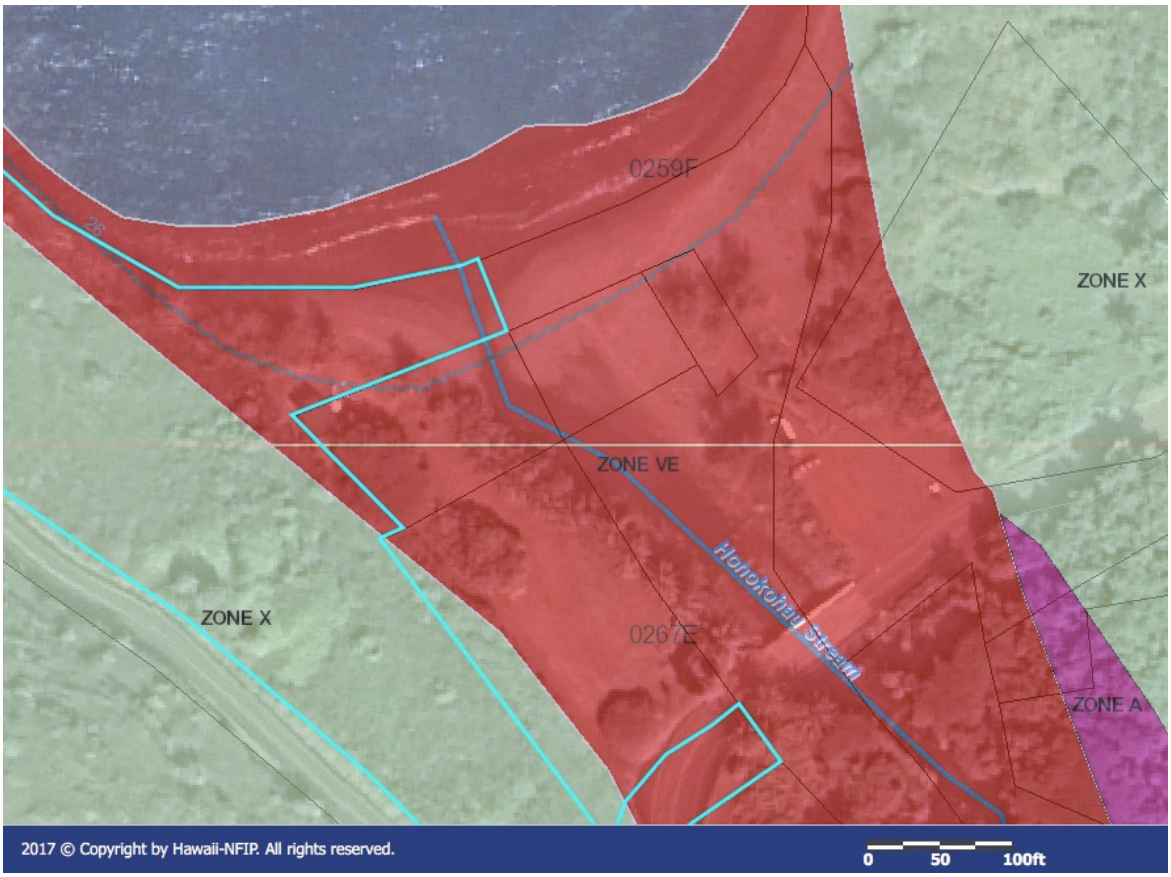



**Figure 22:** Honokōhau Stream and Gulch flood zones.

**Information Limitations**

The flood zone maps are sufficient for planning and management purposes.

### 2.4.5 Beach Erosion

The natural remoteness of Līpoa Point comes, in part, from its rugged volcanic cliff lines and rocky headlands that are predominant features within the coastal landscape. There are, however, a few sandy shorelines in the area consisting of sand or cobble pocket beaches. These can be found at Honolua Bay, at several spots below Līpoa Point, at Keonehelele'i Beach and in Honokōhau Bay.

Erosion trends on Maui have been analyzed by Dr. Chip Fletcher, et. al., and published in the 2003 Maui Shoreline Atlas. The orientation of the coast on this portion of West Maui towards the northwest exposes it to winter swell events. The atlas provides annual erosion hazard rates for transects spaced 66 feet apart in Honolua Bay (Figure 23). However, Keonehelele'i Beach was excluded from the atlas due to its remoteness and lack of development pressure.

**Potential Impacts and Management Issues**

Fortunately, very little infrastructure is in erosion hazard zones. Honolua Bay has experienced some beach erosion and shoreline retreat, whereas Keonehelele'i Beach could be susceptible to erosion based on

observations made at the site. Pocket beaches at the bottom of the cliff line along Līpoa Point could also be in an erosional phase.

**Honolua Bay**

The Maui Shoreline Atlas identifies the beach at Honolua Bay as being sand and cobble that has experienced light erosion, averaging 0.4 feet per year from 1912 to 1997 (Fletcher, et. al., 2003). Average beach width, which is the distance from the vegetation line to low water mark, decreased 21% between 1975 and 1997. Transects 64-70 shown on Figure 23 are 66 feet apart and indicate erosion rates that range from 0.3 to 0.5 feet per year along most of the beach (ibid.). The trends reported for Honolua Bay are similar to changes at other beaches in the Hawea Point to Honolua Bay study area reported in the atlas. Honolua Bay faces northwest but is partially sheltered from winter swells by the high cliffs on both sides of the bay and Līpoa Point. Black volcanic rocks and boulders predominate along the base of the cliffs on the edge of the bay's waters.

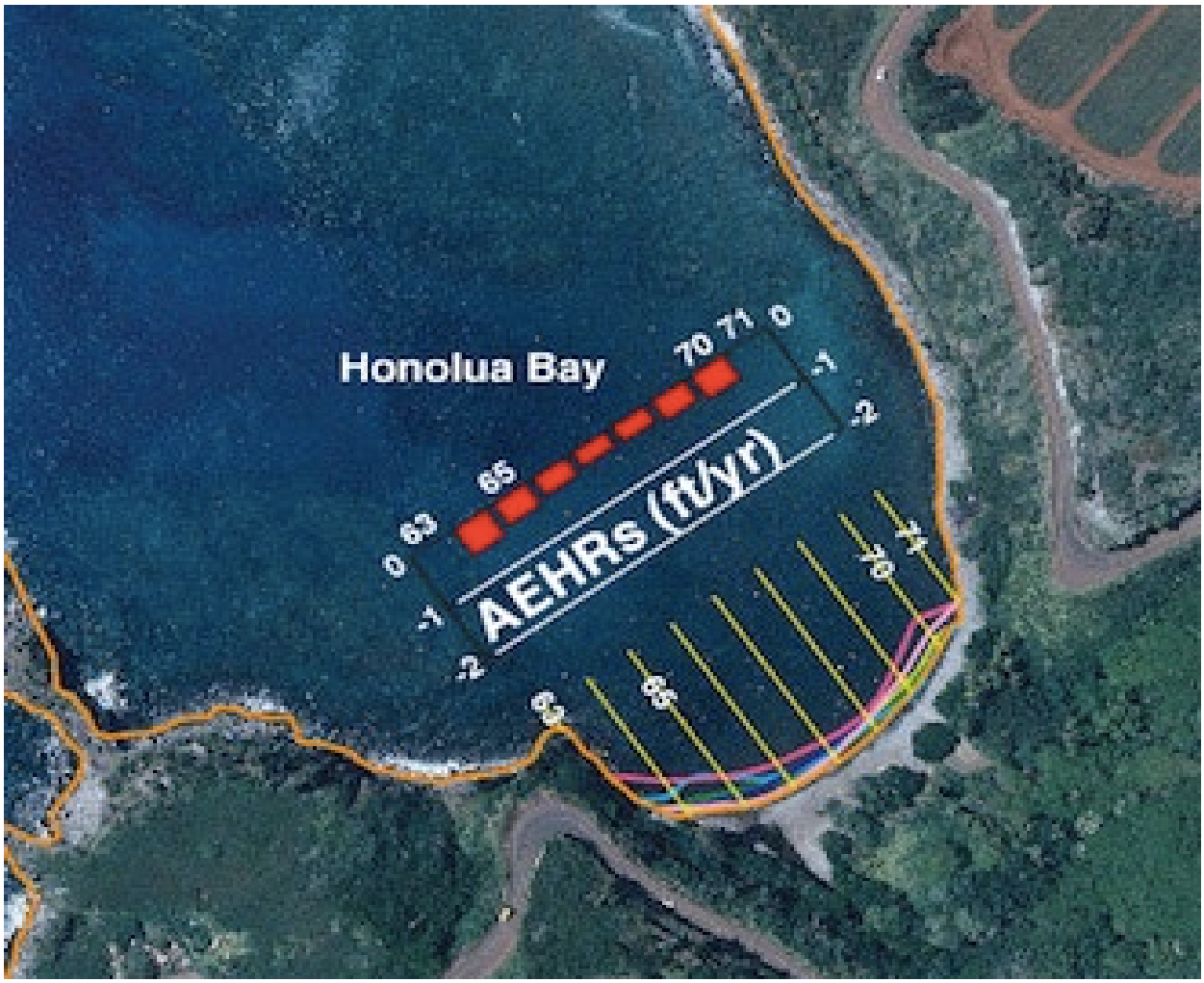



**Figure 23:** Annual Erosion Hazard Rates in Honolua Bay.
*Source*: Maui Shoreline Atlas, 2003 (Fletcher, et. al.)

There is no infrastructure at the bay that would be threatened by beach erosion, and aside from the concrete for the boat ramp, all other structures are portable or moveable. Additionally, the shoreline at

the back of Honolua Bay rarely experiences large waves given its relative protection by the bay's fringing cliffs, reefs, and limited exposure to direct northeast winter swells.

**Līpoa Point**

Effects of erosion on the small, pocket beaches along the cliff line are unknown. With greater storm intensity predicted in the future, as well as rising seas, most of the sandy shores will likely disappear. Beach width would be expected to narrow as the sea cliffs behind these beach pockets prevent retreat of the shoreline and do not offer erodible reservoirs of sand. As a result, the route of footpaths leading to favored surf or fishing sites may change over time. There is no infrastructure that would be threatened by beach erosion at Līpoa Point.

**Keonehelele'i Beach**

Keonehelele'i Beach and Honokōhau Bay were excluded from Maui County's Shoreline Atlas due to their remoteness and the lack of development pressure in these areas. However, there is no infrastructure that would be threatened by beach erosion.

There are no sand dunes behind the beach although some sand reservoirs may exist, particularly towards the mouth of the gulch on the western end of the beach. A reef shelf extends offshore which breaks up some incoming wave energy and creates shallow soaking and swimming areas. Good waves form seasonally for body boarding and surfing just offshore.

A tree-lined embankment behind the eastern side of Keonehelele'i Beach is used for informal camping. This area will become smaller as the shoreline retreats. The clay embankment will erode over time from high waves and storm surge, leading to its collapse and the discharge of sediment into nearshore waters. The embankment will also tend to become steeper thereby hindering ease of access between the campsites and the sandy beach. Tall trees, such as mature ironwoods, will tilt and fall seaward as their roots become undermined by erosion and the area becomes unstable. Fallen trees could create snags in the water or form impediments along the beach. Removal of non-native ironwood trees and replanting with native species such as beach heliotrope could make the shoreline more resilient to climate change. The trees along the embankment, and around the camp sites, should be monitoring and removed if they threaten public safety.

*Keonehelele'i Beach will experience continued erosion with sea level rise.*

**Information Limitations**

There is minimal data on the location or quantity of sand reservoirs, such as those located in backshore embankments or the amount of sand that could be produced from eroding cliff lines near Līpoa Point. Erosion rates at Keonehelele'i Beach haven't been determined. When the Maui Shoreline Atlas is updated, an annual erosion hazard map should be prepared for this coastline.

## 2.5 Summary of Existing Conditions and Issues

The project area, and abutting coastal waters, include concentrations of resources deemed to be of value to the residents of Hawai'i including cultural resources historic and archaeological sites, wildlife habitat, world class surfing, snorkeling, scenic views, and agricultural resources.

Through the scoping process, many issues were identified that will require careful management if the resources of the project area are to be protected for the benefit of current and future generations. Many of the issues that have been identified will be exacerbated by the effects of climate change. Table 1 summarizes the potential impacts, management issues and information limitations identified in sections three through six. Specific management issues, or challenges, can be grouped into nine categories as depicted in Table 2.

| REPORT SECTION | POTENTIAL IMPACTS / MANAGEMENT ISSUES | INFORMATION LIMITATIONS |
|---|---|---|
| **3.0 FACILITIES** | | |
| 3.1 Honolua Bay | • The informal parking along the highway poses a safety hazard as occupants unload gear and enter and exit vehicles<br>• The capacity of the three portable toilets in the parking lot to handle increasing user demand<br>• The capacity and security of the trash receptacles | • Parking counts<br>• User survey<br>• Information on the capacity of the portable toilets and the service schedule<br>• Information on the quantity, type, and regularity of rubbish accumulation |
| 3.2 Kulaokaʻeʻa / Līpoa Point | • Safety of egress / ingress from Honoapiʻilani Highway into the Līpoa Access Driveway (eg. adequate site distance)<br>• Informal / haphazard parking along both sides of the Līpoa Point Access Driveway during busy holidays and weekends<br>• Constrained emergency vehicle access along the Līpoa Point Access Driveway<br>• Erosion and sedimentation from the Līpoa Point Access Driveway into Honolua Bay<br>• No toilets – potential urination / defecation into natural areas (ocean and land)<br>• No trash cans or recycle bins – potential for littering and dumping<br>• Hazardous trail conditions around Kulaokaʻeʻa plateau, along the shoreline, and down to popular surf spots. | • Parking counts<br>• User survey<br>• Information on the quantity, type, and regularity of rubbish accumulation |
| 3.3 Keonehelele'i Beach | • During heavy rains the dirt driveway is muddy and impassable<br>• No toilets – potential urination / defecation into natural areas (ocean and land)<br>• Capacity and security of the trash receptacles<br>• Palette burning which leaves nails to rust and become a safety hazard to beach users<br>• Limited formal signage to address public safety and the management of human activities | • Parking counts<br>• User survey<br>• Information on the quantities, types, and regularity of rubbish accumulation |
| **4.0 NATURAL AREAS** | | |
| 4.1 Watersheds and Bays | | • Better data for the Honokōhau watershed |
| 4.1.1 Streams and Gulches | • Surface runoff from the following areas threatens the health of the marine ecosystem and impairs coastal water quality, particularly in Honolua Bay and along Keonehelele'i Beach:<br>▪ Honolua stream and its tributaries<br>▪ The western side of Līpoa Point<br>▪ The western half of the former pineapple fields<br>▪ The eastern portion of the Plantation Estates<br>▪ Pōhakupule Gulch which extends upland of Keonehelele'i Beach | • Data on the frequency, quantity or quality of freshwater flow from the Pōhakupule and Punaha gulches, the Keonehelele'i coastline, and Honokōhau Bay<br>• Analysis of sedimentation sources with the project area |
| 4.1.2 Groundwater Flows | • The project area is located downhill and seaward of the UIC line; drilling of a well for either potable or irrigation water could be constrained. | • Data on subsurface and groundwater flows to Honolua Bay, Keonehelele'i Beach, and Honokōhau Bay |
| 4.1.3 Water Quality | • Sedimentation into the bay and sediment accumulation in gulches causing turbidity and water quality impairment<br>• Complex modern chemical stressors, such as sunscreen, pesticides, and herbicides threaten nearshore marine life<br>• Parking areas near Honolua Stream are sources of sediment, oil, and waste that can enter the stream or gulch<br>• Runoff from the dirt Līpoa Point Access driveway that leads from Honoapiʻilani Highway to Līpoa Point is a major source of sediment<br>▪ Close to the hillside, the access driveway is cut across the topographic contour and consists of erodible clay soils with gravel amendments<br>▪ Eroding foot trails along Līpoa Point contribute sediment to nearshore waters<br>▪ The vegetation along the Līpoa Point cliff edge is degraded and subject to erosion because of the cars that park on the side of the driveway<br>▪ Ruts and gullies have formed within the driveway's surface resulting in additinal sedimentation<br>• Storm runoff through the Pōhakupule Gulch discharges at the mouth of the stream at Keonehelele'i Beach | • Information on the extent of sediment released from the Līpoa Point road, and its eventual disposition<br>• Continued studies of contaminants and their relative contribution to Honolua Bay's water quality and coral vitality, as compared to overland runoff and stream flow could be helpful.<br>• More frequent data of water quality within Honolua Bay and near Līpoa Point<br>• Information on the comparative influence coral larvae movement has on Honolua Bay's reef system<br>• Groundwater characterization |
| 4.2 Geology, Soils and Toxicology | • Foot trails to informal lookouts are often unstable and slippery, which can lead to slips, falls or injury<br>• Abandoned vehicles within the project area may lead to soil contamination or impact to nearshore water quality | • Information on the type of waste that was disposed in the former waste disposal area near Honolua Stream |
| 4.3 Flora and Fauna | | |

| REPORT SECTION | POTENTIAL IMPACTS / MANAGEMENT ISSUES | INFORMATION LIMITATIONS |
|---|---|---|
| 4.3.1 Marine Life and Corals | • The greatest decline in coral cover observed on any surveyed reef in Maui was at Honolua Bay.<br>  ▪ Factors such as increased sedimentation, nutrients, chemical run-off and other forms of pollution have likely driven the decline in coral coverage.<br>• Pole fishing is popular along the rocky shoreline from Līpoa Point to Punalau Point. | • Creel or angler surveys, where an individual fisher keeps track of their fishing effort, method, gear, and catch and reports this information for fisheries management purposes. |
| 4.3.2 Flora | • Introduced species have out-paced many indigenous plants on the project area.<br>• Vegetation is predominantly non-native and dominated by weedy grasses, shrubs and trees (Hobdy, 2007).<br>• Ironwoods, hale koa and other invasive plants dominate the steep slopes along the Keonehelele'i coastline, and guinea grass and hale koa are common invasive species in more open areas and around gulches. | • Flora survey of the project area |
| 4.3.3 Fauna | • Avian species observed by Hobdy were limited to seven non-native species during two site visits in 2007 including: Common myna (acridotheres tristis), zebra dove (geopelia striata) gray francolin (francolinus pondicerianus), house finch (carpodacus mexicanus), red-crested cardinal (paroaria coronata), spotted dove (streptopelia chinensis), and Japanese white-eye (zosterops japonica). | • Fauna survey of the project area |
| 4.4 Ecological Protection | | |
| 4.4.1 Species Protections | • Over 100 plant taxa are extinct, and over 200 have 50 or fewer individuals remaining in the wild. | |
| 4.4.2 Humpback Whale National Marine Sanctuary | • Humpback whales are designated as "depleted" under the Marine Mammal Protection Act (MMPA) and afforded some levels of "approach" protection.<br>• Waters offshore of Līpoa Point and Keonehelele'i Beach are not within the sanctuary; but marine mammal approach rules still apply. | |
| **5.0 ARCHAEOLOGICAL AND CULTURAL RESOURCES** | • Nearly two dozen archaeological sites were identified in an Archaeological Inventory Survey of the Līpoa Point project area (Figure 25) with most being found along or near the pali (2007 AIS prepared by Dega and Pickett). | • An Archaeological Inventory Survey of the entire project area<br>• A cultural resources survey that identifies existing cultural resources, contemporary traditional practices, and mo`olelo that may be tied to specific landscape features. |
| **6.0 COASTAL HAZARDS** | | |
| 6.1 Sea Level Rise | • Honolua Bay is very susceptible to SLR changes.<br>• Inundation of the Honolua Bay stream mouth and rising groundwater will impact access routes across the stream.<br>• More frequent coral reef bleaching events and incidents of disease.<br>• Erosion and eventual permanent loss of the beach along Līpoa Point.<br>• Narrowing of Keonehelele'i Beach.<br>  ▪ Steeper embankment—undercut and falling trees. | • An erosion pattern study at Keonehelele'i Beach. |
| 6.2 Tsunami Hazard | • Honolua Bay is at a high risk of inundation due to a tsunami.<br>  ▪ Houses and residences located within the gulch inland of the roadway are susceptible to damage.<br>  ▪ The roadway is susceptible to damage or could be blocked by debris.<br>• Inundation of campsites and other low-lying areas of the Keonehelele'i coastline and Windmills Beach.<br>• Inundation of the bridge crossing Honokōhau Stream and the roadway blocked by debris. | • No apparent signage of evacuation routes.<br>• Verify that project area is in audible range of a tsunami warming siren. |
| 6.3 Hurricane Hazards | • Possible obstruction of east and west evacuation using Honoapi'ilani Highway.<br>  ▪ Flooding and debris blockage of the bridge over Honolua Stream.<br>• Keonehelele'i Beach is highly susceptible to the impacts of hurricanes.<br>  ▪ Erosion of beaches<br>  ▪ Erosion of the access driveway which will which will likely block escape routes<br>  ▪ High risk of landslides and falling boulders<br>  ▪ Campers at risk of injury or being trapped if caught in a hurricane | • No apparent signage. |
| 6.4 Flood Hazards | • Honolua Bay is at risk of flooding from both upcountry stormwater and incoming wave action.<br>• The Honolua Bay Access Path is susceptible to flood inundation and potentially impassable after a heavy storm.<br>• Keonehelele'i Beach and Punaha gulch are at risk of flooding from both incoming waves and downhill stream flow.<br>• Honokōhau may be dangerous during a large storm event due to the narrow road; rocks and soils can be dislodged and hinder safe vehicle passage. | |

| REPORT SECTION | POTENTIAL IMPACTS / MANAGEMENT ISSUES | INFORMATION LIMITATIONS |
|---|---|---|
| | • Risk of flooding from Honokōhau Stream. | |
| 6.5 Beach Erosion | • Narrowing and eventual permanent beach loss at Līpoa Point.<br>• Route of the footpaths leading to favored surf or fishing sites may change over time.<br>• Impact of shoreline erosion at Keonehelele'i Beach:<br>▪ Erosion of the clay embankment and the subsequent collapse and discharge of sediment into nearshore waters;<br>▪ Steeper embankment making the sandy beach more difficult to access from nearby campsites;<br>▪ Uprooting of trees, which will create snags in the water or form impediments along the beach; and<br>▪ Narrowing of the camping area at Keonehelele'i Beach due to shoreline retreat. | • An erosion pattern study at Keonehelele'i Beach. |

**Table 1:** Summary of Potential Impacts / Management Issues.

| | MANAGEMENT CATEGORY | MANAGEMENT ISSUE |
|---|---|---|
| 1. | **Ecological Restoration/Management (resilience)** | Mauka to makai interactions<br>Cliff and coastal erosion<br>Sedimentation of coastal waters<br>Invasive species control<br>Feral ungulate management<br>Human trampling/destruction |
| 2. | **Cultural & Archaeological Resource Restoration/Management** | Looting, trampling, desecration of archaeological sites<br>Reduced access for native Hawaiian traditional gathering rights<br>Depletion of customary resources<br>One-lane bridge |
| 3. | **Hazards/Public Safety** | Fire management (fuel load reduction)<br>Tsunami threat/evacuation<br>Hazardous conditions<br>Cliffs/trails<br>Falling branches/trees<br>Tide and emerald pools<br>Waves/currents<br>Flash flood |
| 4. | **Human Activities** | Crime/vehicle break-ins<br>Trespassing<br>Drug dealing<br>Squatting<br>Poaching<br>Dumping/car abandonment/littering<br>Camp and beach fires |
| 5. | **Overuse** | Tourism<br>Commercial activities (snorkel tours, group tours, food stands, curio's, surf contests)<br>Gentrification of local residents to non-resident visitors<br>Perception of crowding/diminished sense-of-place |
| 6. | **Land Management** | Overgrown brush and trees<br>Sedimentation control |
| 7. | **Infrastructure and Facilities** | Parking lots and driveways<br>Trash cans<br>Toilets<br>Trails |
| 8. | **Education** | Hawaiian history and culture<br>Ecology |
| 9. | **Community Relations** | Gathering community input<br>Information sharing and building partnerships |
| 10. | **Funding** | Need for adequate, ongoing, and stable funding for management and capital improvement needs |

**Table 2:** Management categories and issues.

## 3.0 PUBLIC OUTREACH HIGHLIGHTS

The purpose of the community outreach process was to identify shared values and objectives for the future use, preservation, and management of the Līpoa Point and Honolua Bay project area. The specific objectives associated with this purpose were to achieve the following:

- Provide an opportunity for the community and key user groups to outline their beliefs, concerns, and needs regarding the project area, provide input on existing uses, and identify preferences for proposed improvements; and
- Solicit broader community ideas and suggestions regarding existing and future use and management of the project area.

The planning process was comprised of two distinct phases:

1. Phase 1 (December 2016 through March 2017): a *community assessment and meeting design phase* during which the DLNR and its consultant team hosted preliminary meetings and site visits with agency stakeholders, conducted interviews with community stakeholders, and completed the design of stakeholder and community outreach meetings.

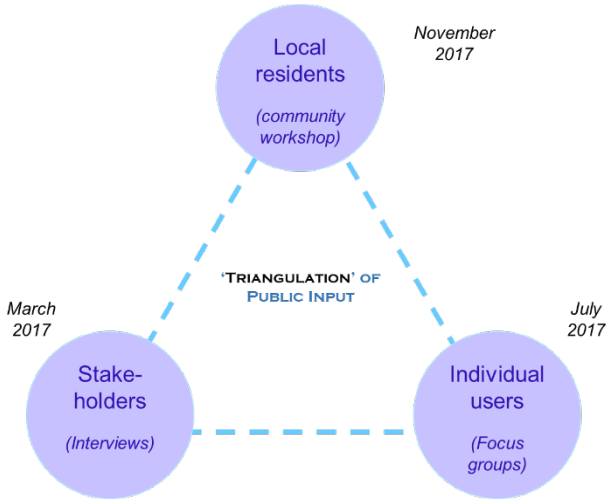



**Figure 24:** Triangulation of Public Input

2. Phase 2 (March – November 2017): a *public and agency outreach phase* during which the DLNR conducted a series of facilitated stakeholder meetings, agency planning meetings, and a community open house. The smaller stakeholder meetings were followed by the larger open house where the DLNR invited representatives from across priority stakeholder groups, as well as the broader public, to attend and participate in a series of participatory mapping exercises designed to elicit input for the future of the project area's use and management. In this regard, the public engagement process included both small focus groups and larger community meetings. The findings from stakeholder interviews, stakeholder focus group meetings and the community open house were triangulated to help validate the results (Figure 24).

**Stakeholder Group Meeting Highlights**

As part of the public process the DLNR conducted a facilitated focus group session with each of the following three stakeholder groups: community residents, marine resource users and lineal descendants. The focus group meetings included two sessions. Session 1 was a facilitated invited opinion exercise built around the following four questions:

(1) Why do you care about Līpoa Point and Honolua Bay? Why is the area important to you?
(2) What do you believe are the most important issues currently facing the area?
(3) What activities/uses do you believe are the most problematic in the area?

(4) What are the greatest needs relating to the infrastructure/facilities at Līpoa Point and Honolua Bay that should be prioritized under a future management plan?

Session 2 included a facilitated charrette mapping exercise designed to elicit input about specific stakeholder concerns and potential improvements organized geographically.

Summary results from Question 1, of the invited opinion exercise, are presented below:

*Question 1: "Why do you care about Līpoa Point/Honolua Bay? Why is the area important to you?"*

- Stakeholders from all three focus groups offered a total of 65 individual responses to Question 1. This represents 23% of all individual responses offered by all stakeholders across all four questions.
- More than half (62%; n=40) of all individual responses reflect a personal connection between the respondent and the area. Of these, a family history/connection (18% of all responses) and a site for personal relaxation and/or recreation (17%) represent the most common personal connections, followed by a feeling that the site is a "sacred" space and/or where the respondent has a spiritual connection (14% of all responses). Several respondents (12%; n=8) were "born and raised" in the area or have spent a long time living there, and thus see the area as their "home" or "backyard".


**Figure 25:** Key Word Questions for Q1 – Why do you care about Līpoa Point / Honolua Bay? Why is the area important to you?

- Nearly one-quarter (23%; n=15) of all individual responses relate directly to the natural or ecological importance or uniqueness of the area for Maui.
- Some respondents (15%; n=10) recognize that Līpoa Point and Honolua Bay is of cultural and historic importance to the Kānaka Maoli and that it must be maintained and protected.
- Content analysis of key word frequencies for all individual responses to Question 1 identifies the following key words as being the most commonly cited by respondents: sacred, home, fishing, gathering, preserve, and surf (Figure 25).

**Comparative Analysis**

*Question: How do the Session One results vary across all three stakeholder groups?*

- A total of 283 individual responses were offered by participants from all three stakeholder groups, representing 70% of the total responses (individual and group) provided.
- Some responses offered are evenly represented or shared across all three stakeholder focus groups.
- However, certain stakeholder focus groups explain nearly all or most of the responses offered to specific questions.

*Relating to why respondents care about or believe that the project area is important (Question 1):*

- Respondents across all three stakeholder groups recognize the natural importance/significance of the project area (Figure 26). This was the most frequently cited response (23% of all responses offered). Similarly, respondents across all three stakeholder groups call Līpoa Point and Honolua Bay their "home" or "residence."
- Individual responses regarding the cultural importance/significance of the project area (15% of all responses offered) were largely contributed by lineal descendants. Similarly, personal or family connections to the area (18% of all responses) were largely contributed by lineal descendants.
- Nearly all the individual responses regarding the importance of the area for recreation and relaxation (17% of all responses offered) were contributed by marine resource users.
- Both lineal descendants (stakeholder group #3) and community residents (stakeholder group #1) account for nearly all the responses offered regarding the sacred/spiritual significance of the area.

*Relating to which concerns or issues respondents believe are the highest priority for the area (Question 2):*

- Respondents across all three stakeholder groups recognize the need for improvements, restoration, and maintenance of the project area (Figure 27). This was the most frequently cited concern raised by respondents (32% of all individual responses).
- Concerns regarding pollution of the site were largely contributed from the marine users and lineal descendants.
- Concerns regarding crowding and overuse of the project area were largely explained by the marine users.
- Respondents across all three stakeholder groups recognize the need for improved site management, including increased enforcement of existing rules and regulations.
- Public access concerns were infrequently offered (4% of total responses) and offered only by lineal descendants.
- Only a few respondents (4% of total responses) across all three stakeholder groups cited public safety concerns.

**Figure 26.** A bar chart of the relative proportions of individual responses offered to Question #1 (beliefs regarding importance of area) by each stakeholder group.

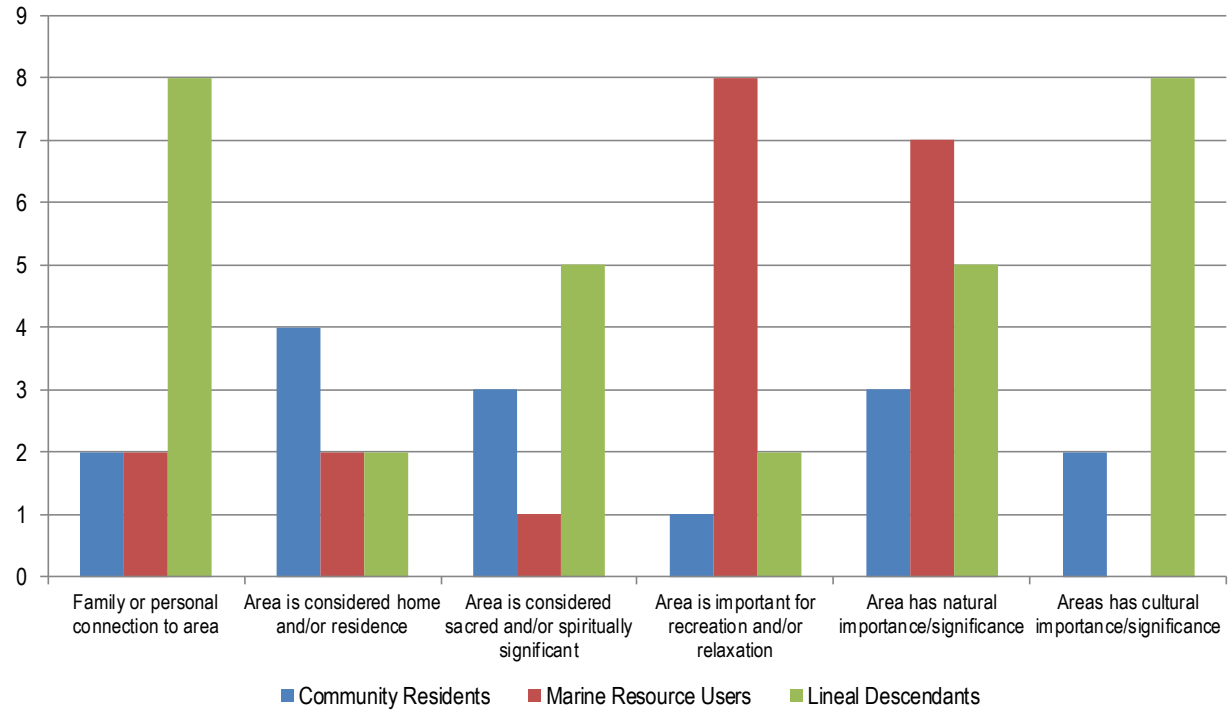
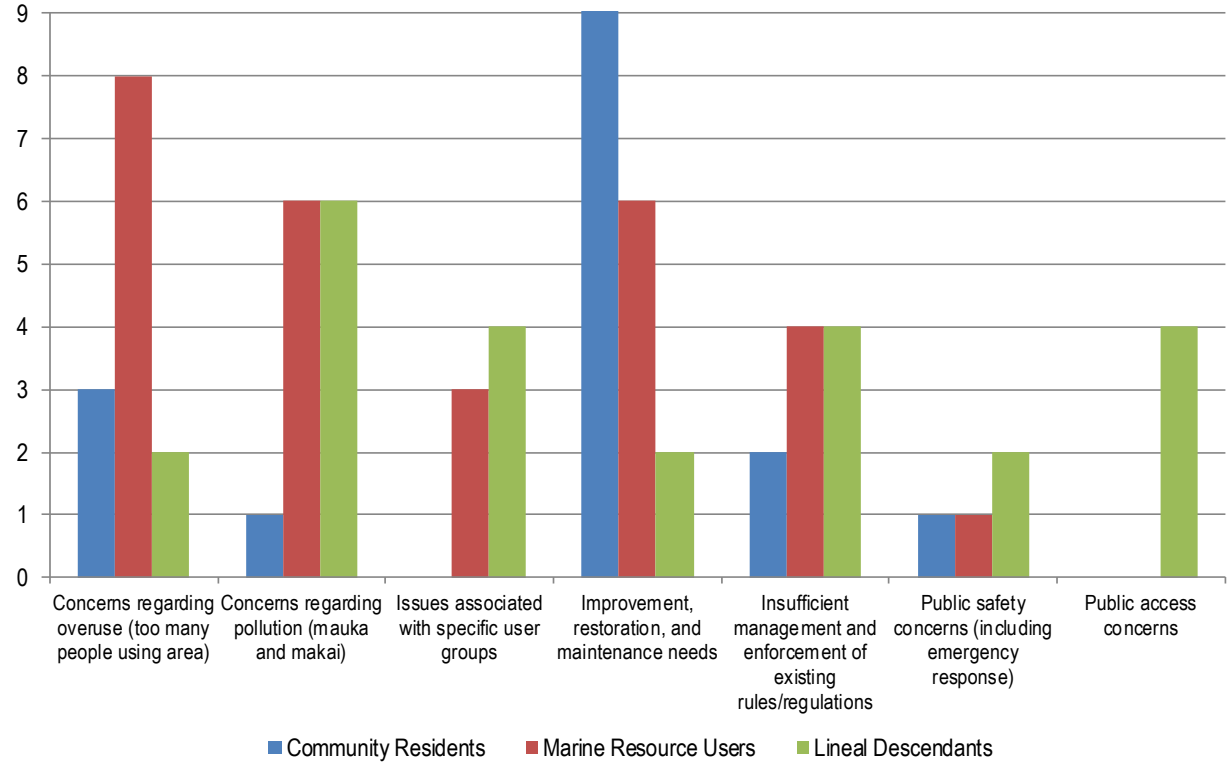



**Figure 27.** A bar chart of the relative proportions of individual responses offered to Question #2 (beliefs regarding highest priority concerns/issues), by each stakeholder group.



As part of the facilitated focus group meetings, the DLNR hosted design charrettes with Honolua Bay and Līpoa Point user groups. The purpose of the design charrettes was to: 1. Identify the geographic area on land of general opportunities and concerns; and 2. Identify the location of recommended management, facility and infrastructure improvements. The DLNR collected and analyzed seven charrette maps through this process.

*Stakeholders providing input to support the future management of Honolua Bay and Līpoa Point.*

**Open House Highlights**

The DLNR followed up from the stakeholder meetings with a community open house to gather broad community input on some of the common ideas and themes that were identified through the stakeholder interviews and facilitated focus group meetings.

The DLNR structured the open house so that participants could visit at any time during the open house's hours, and walk around, look at the exhibits, and contribute their ideas at their own pace through participatory mapping exercises and several survey questions.

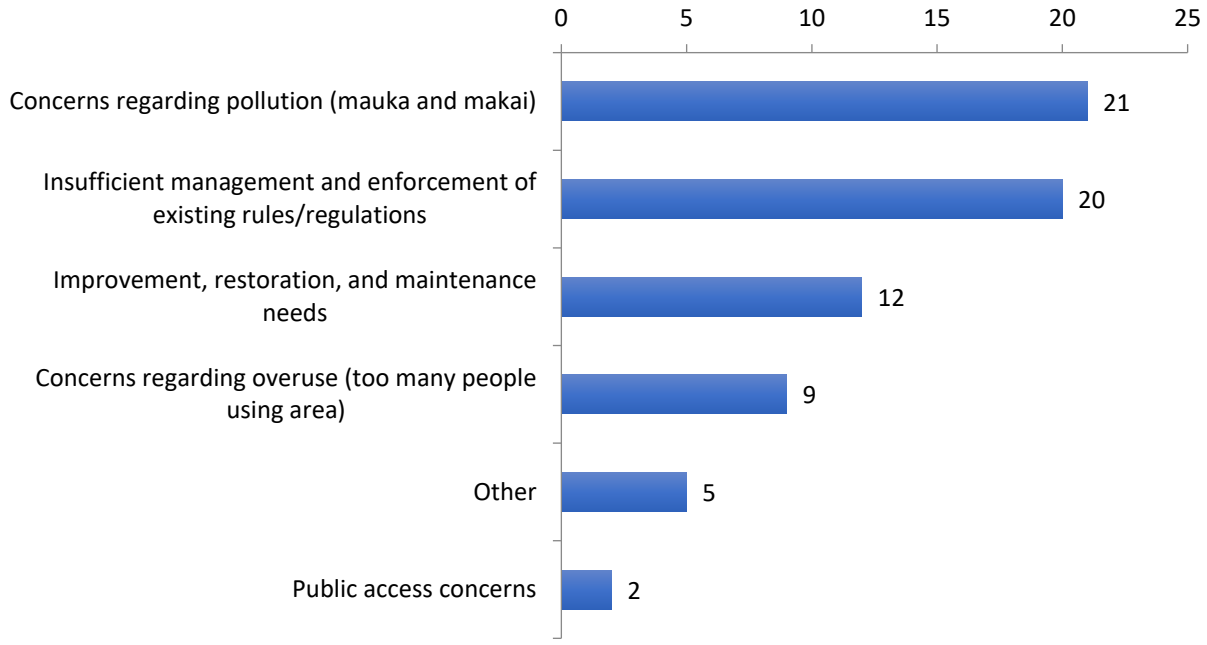



**Figure 28**: Most important issues.

Through one of the surveys (n=69), the DLNR asked open house attendees the following question: *"What do you believe are the most important issues currently facing Līpoa Point?"* The most commonly cited issue by respondents (30% of all responses; n=21) relates to pollution, particularly concerning "runoff" (n=12 responses). The second most commonly cited issue relates to poor site management and lack of enforcement of existing site rules and regulations (29% of all responses; n=20) (Figure 28). Content analysis of key word frequencies for all individual responses to this question identifies the following keywords as being the most commonly cited by respondents: overuse, sedimentation, development, preservation, and tourism (Figure 29).


**Figure 29:** Word cloud of key concerns.

The DLNR also wanted to gather information about the future activities and uses the public felt were appropriate at Honolua Bay and Līpoa Point. The DLNR mounted a map of the project area on the wall. Different activities/uses were printed onto labels and placed in bowls. Respondents were asked to place labels on the map, identifying what future activities and uses they would like to see in specific locations (Figures 30).

Summarizing the data collected from the map[3], respondents of the mapping exercise said the top three activities/uses they felt were appropriate were surfing (16%), kalo cultivation (14%), and sustainable agriculture (11%). The three activities/uses that were least wanted, according to respondents, were picnicking (1%), camping (1%) and landscaped park space (2%).

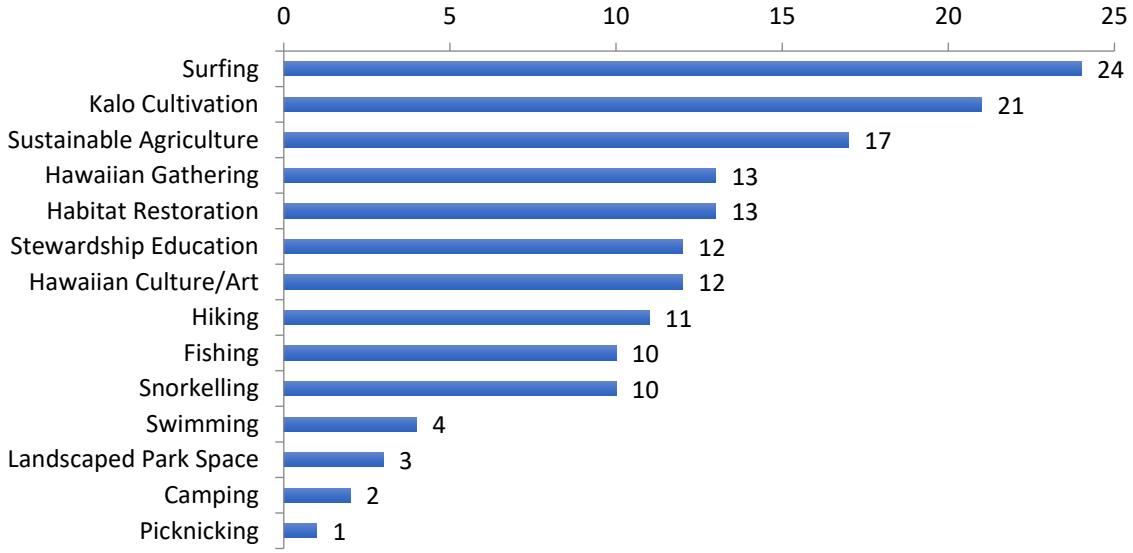



**Figure 30:** Appropriate activities and uses for the project area as identified by open house survey participants.

Figure 31 illustrates how participant preferences for specific activities vary by geographic location in the project area.

The DLNR gathered additional input from open house participants to see if they felt specific geographic locations within the project area were being overused, underused, or were in balanced use. To achieve this, a map of the project area was mounted on the wall. Respondents were asked to place dots on the map to identify areas they felt were underused, overused or whether the level of use was appropriate. Participants placed red dots in areas they thought were overused, yellow dots in areas they felt were in balanced use, and green dots in areas they felt were underused (Figure 32).

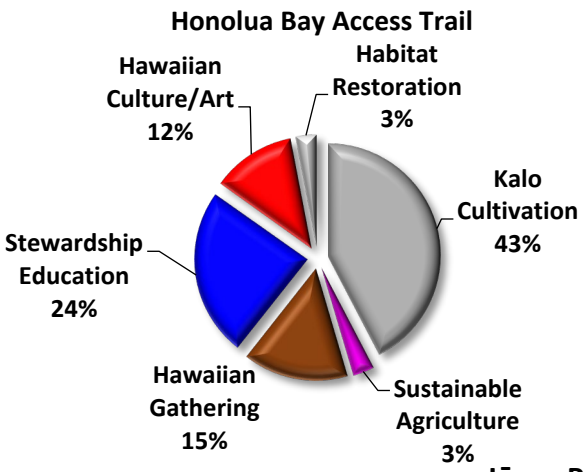
A significant majority of participants felt the Honolua Bay Trail was overused (36 red dots). Participants also felt Līpoa Point Makai (31 red dots, one yellow dot) and Keonehelele'i Beach (17 red dots) were overused.

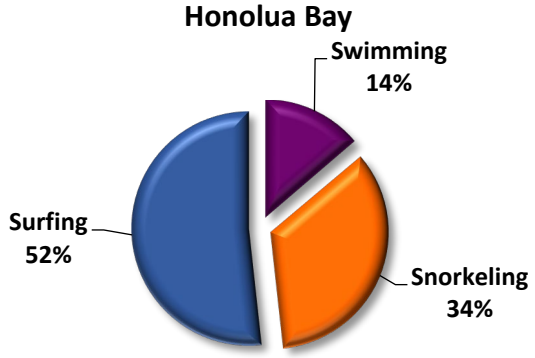
[3] For the purpose of this analysis, the data collected from the following areas w omitted: Honolua Stream (mauka), Keonehelele'i Beach, Honokōhau Bay, Honokōhau Valley, and Līpoa Point (mauka of Honoapi'ilani Highway).

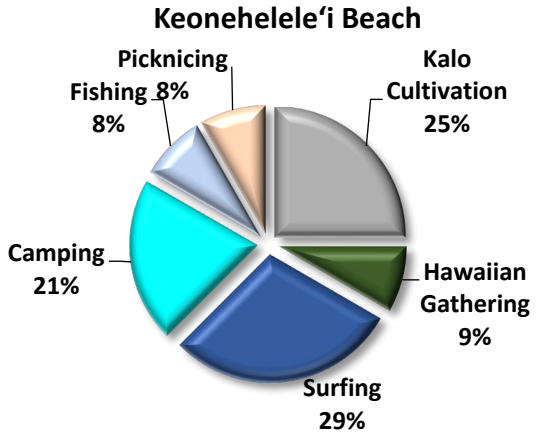
Desired Uses and Activities Within Specific Project Areas

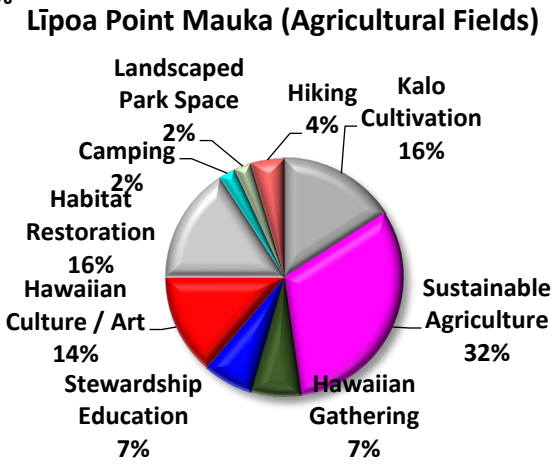
- At Honolua Bay Access Trail, 43% of respondents (n=14) would like to see kalo cultivation in the future and 24% (n=8) would like to see stewardship education.
- At Honolua Bay, the respondents viewed water-related sports and recreational activities to be appropriate. The three activities/uses most often mentioned to be appropriate were: surfing (52 %; n=15), snorkeling (34%; n=10), and swimming (14%; n=4).
- The top three activities/uses that respondents wanted at Līpoa Point along the coastline (makai) were: surfing (26%; n=9), hiking (26%; n=9), and fishing (21%; n=7).
- The top three activities/uses that respondents wanted at Līpoa Point (Agricultural Fields) were: sustainable agriculture (32%; n=14), kalo cultivation (16%; n=7), and habitat restoration (16%; n=7).

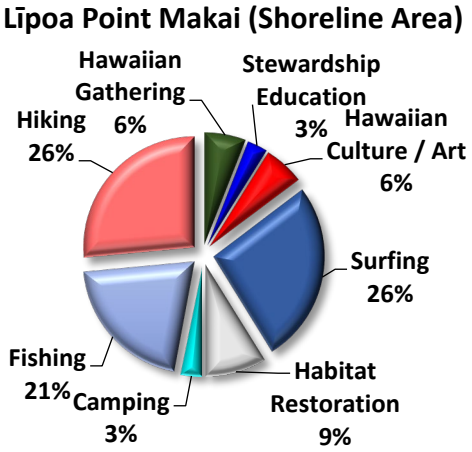
Figure 31. Appropriate activities/uses of the Honolua Bay Access Trail (top left), Honolua Bay (top middle), Keonehelele'i Beach (top right), Līpoa Point (Agricultural Fields) (bottom left), and Līpoa Point (makai) (bottom right) as identified by open house participants.



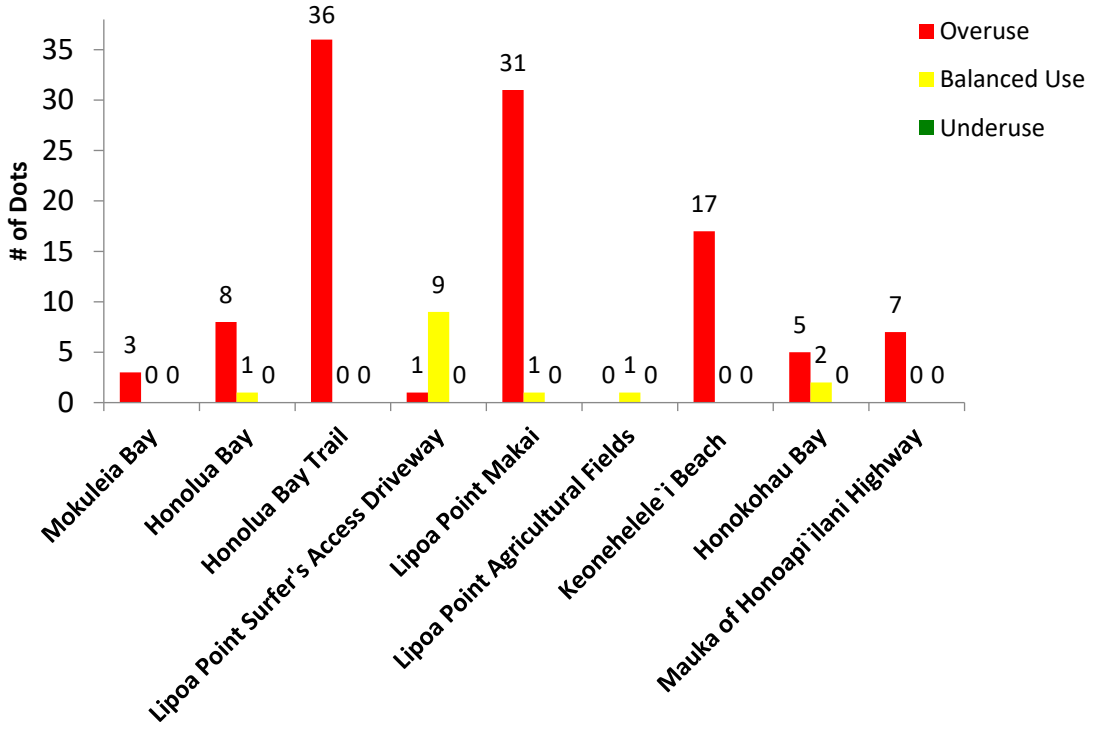



**Figure 32:** Open house survey respondent's perception of overuse, by geographic area.

The DLNR asked survey respondents what measures they would support to manage the number of people using Honolua Bay (Figure 33). Respondents were provided with the following management strategies (listed below) and were asked to check all that apply.

- ❑ Charge Non-resident Visitors a User Fee
- ❑ Limit the Number of Parking Stalls
- ❑ Charge a Fee for Parking
- ❑ Establish a Quota of the Number of Non-resident Visitors Per Day
- ❑ Reduce the Number of Commercial Tour Boats Operating in the Honolua Bay
- ❑ Close Honolua Bay to Non-resident Visitors 1 to 2 Days Per Week
- ❑ Other
- ❑ None of the Above

Thirty-nine open house participants completed the survey. The following are the top three most commonly supported strategies to manage overuse: reduce the number of commercial tour boats operating in the bay (77%; n=30), charge non-resident visitors a user fee (59%), and establish a quota of the number of non-resident visitors per day (51%).

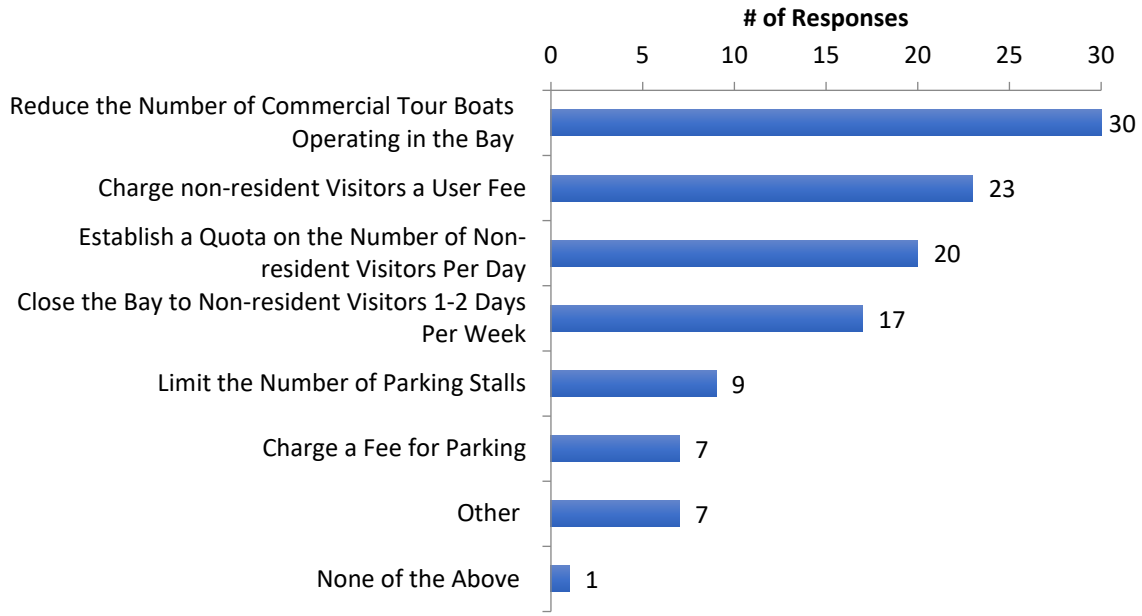



**Figure 33**: Relative support of open house survey respondents to measures intended to manage overuse of Honolua Bay

The same question was asked for Līpoa Point (Figure 34). Similar to Honolua Bay, the following three management strategies were the most supported to manage overuse of Līpoa Point: reduce the number of commercial tour boats operating in the bay (41%; n=16), charge non-resident visitors a user fee (38%), and establish a quota on the number of non-resident visitors per day (33%).

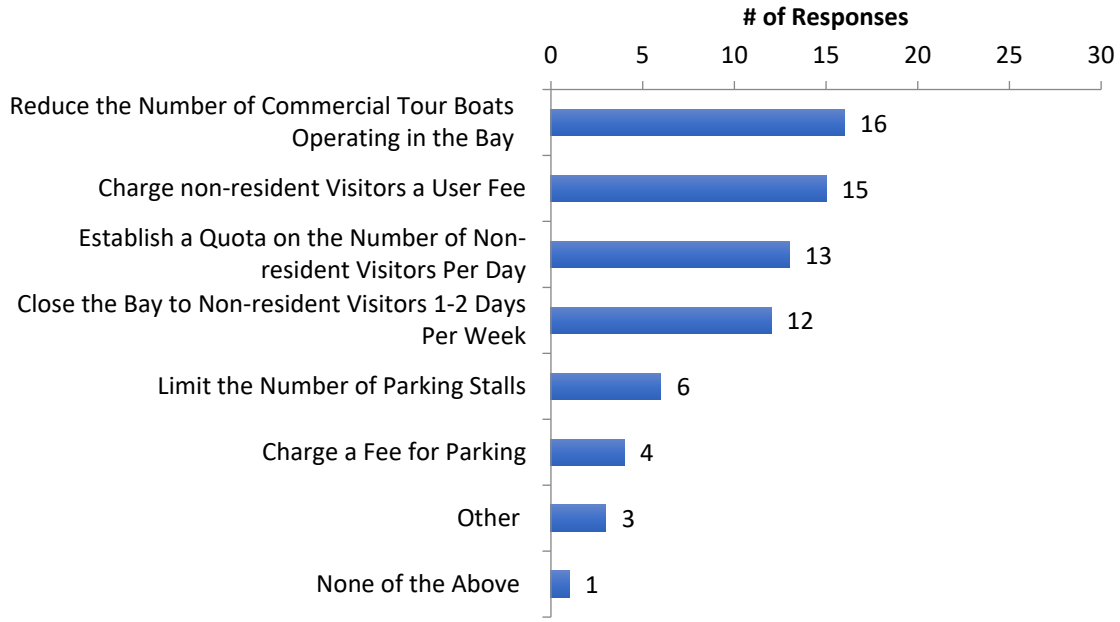



**Figure 34**: Relative support of survey respondents to measures intended to manage overuse of Līpoa Point

The DLNR wanted to gather information on the improvements the public would like to see in the project area. A map was provided which illustrated location specific improvements identified by two or more stakeholder groups during the July 2017 focus group meetings (Figure 35). Respondents were given three red dots and were asked to analyze the map of improvements derived through the stakeholder charrette map exercise. Respondents placed their dots on those improvements they felt were the highest priority. Respondents were given the opportunity to use a comment sheet to write-in any other improvements not included on the map but that they felt were important.

The top three improvements as identified by the respondents were: 1) soil remediation, sustainable agriculture, and/or native tree reforestation of the Līpoa Point agricultural fields provided that such uses do not contribute to sedimentation of coastal waters (24%; n=37); 2) Grade and slope the Līpoa Point Access Driveway away from the bay and provide a bio-swale with a buffer of native plantings on the makai side of the driveway to reduce erosion and sediment discharge into the bay (23%; n=36); and 3) Partner with community groups to restore native habitat (16%; n=25) (Figure 36).

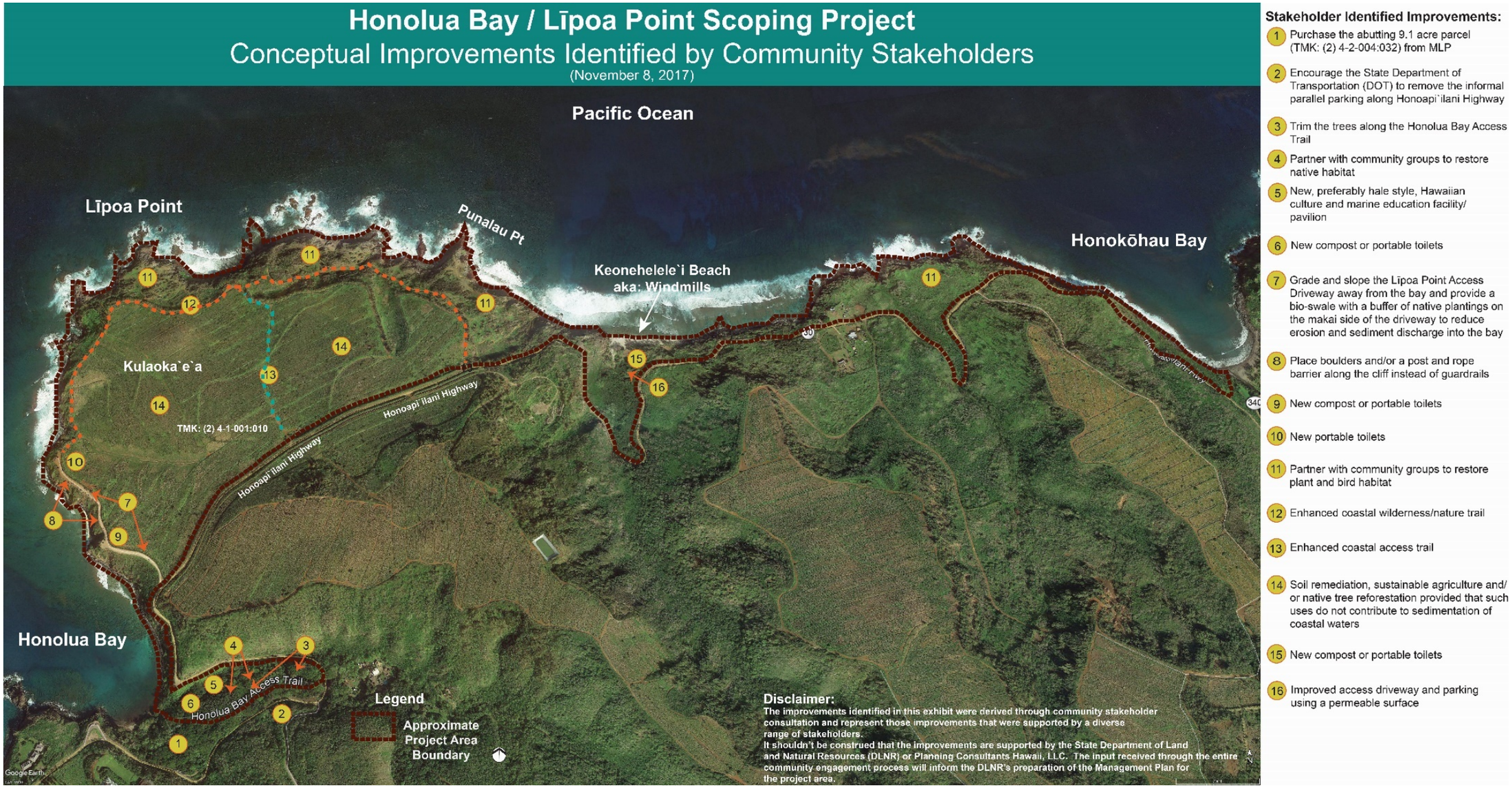



**Figure 35:** Improvements identified my two or more stakeholder groups during the charrette mapping exercise.

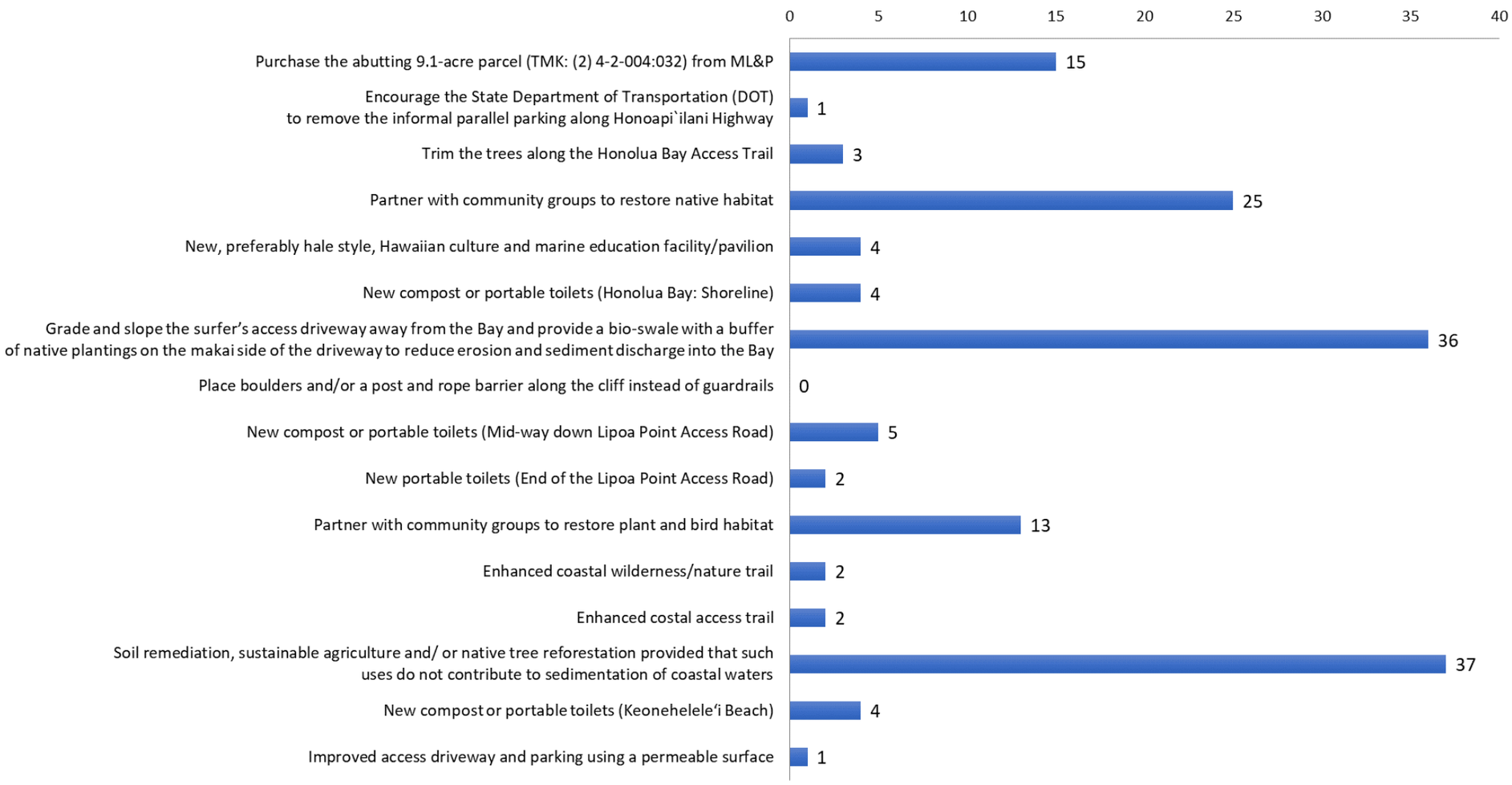



**Figure 36:** Highest priority improvements as identified by open house mappng participants.

## 4.0 Major Planning Challenges

### 4.1 Coastal Resilience and Climate Change

The overwhelming consensus of climate scientists is that "our planet's average temperature could be between 2 and 9.7°F (1.1 to 5.4°C) warmer in 2100 than it is today" (NOAA, 2012). For Honolua Bay and Līpoa Point this means preparing for the impacts of sea level rise and climate change. Low lying areas will be more vulnerable to flooding, and the entire area will be more vulnerable to hurricanes and tsunamis. Stronger and more frequent storms will result in severe and dangerous floods, greater stress on the watersheds, and increased sediment discharge into coastal waters. The management plan should identify specific actions to support a healthy and vibrant coastal ecosystem that will make the area more resilient to the impacts of climate change. Furthermore, the management plan should identify steps that can be taken to protect the public from more frequent and dangerous storms.

### 4.2 Upland development

The land mauka of Honoapi'ilani Highway consists of several thousand acres of undeveloped land, much of which is zoned for agricultural use and owned by ML&P (Figure 37). The agricultural zoned land lies outside of the SMA boundary, and can therefore be subdivided and developed into agricultural lots with "farm dwellings" similar to agricultural subdivisions elsewhere in the immediate area, without any discretionary permits and public review.

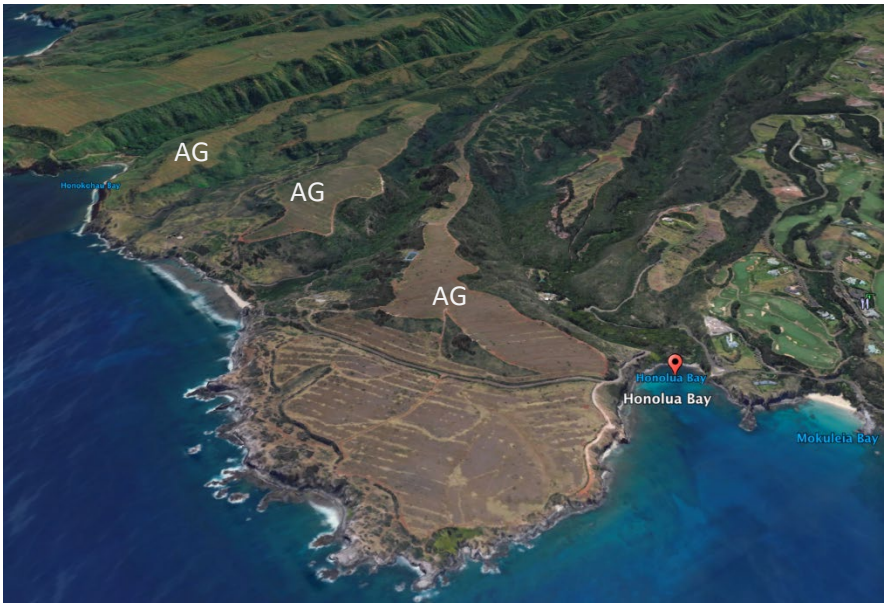



**Figure 37** – Agricultural areas mauka of the project area that could be developed with estate-like farm dwellings.

In the 1990's, the AG zoned land at Plantation Estates in Kapalua was developed into agricultural estates. This occurred because the subdivision was outside the SMA and loosely regulated. The development of the Plantation Estates had significant impacts on the rural character of the area, mauka views and sedimentation. Upland development has exacerbated brown water events, which have deposited sediment onto reef platforms, leading to declines in coral coverage.

The type of development that occurred at the Plantation Estates could also occur on the AG zoned portion of ML&P's parcels mauka of the project area, further threatening the rural character, ecology, open space, water quality and marine life in the project area.

### 4.3 Overuse

The project area is popular among snorkelers, surfers, tourists and locals. Commercial tour boats frequent the bay for snorkeling activities. At the November 8, 2017, community open house participants were asked *"What do you believe are the most important issues currently facing Līpoa Point?".* Content analysis of key word frequencies for this question identify the following keywords as being the most commonly cited by respondents: "overuse"; "sedimentation"; "development"; "preservation"; and "tourism" (Figure 38). In a follow-up question, more than 84% of the respondents felt Honolua Bay was overused.


**Figure 38** – Key word frequencies.

During stakeholder interviews, interviewees noted that overuse of the project area by visitors can make local residents feel less comfortable recreating in the area. Overuse can also have a deleterious effect on the visitor experience and can strain natural resources as well as roadways, parking, toilets and other facilities and infrastructure.

*Commercial tour boats, Honolua Bay, Maui.*

*A typical Sunday with good surf - cars parked on both sides of the Līpoa Point access driveway.*

### 4.4 Sense of Place/Character

The project area offers a unique convergence of cultural and scenic resources as well as natural and environmentally sensitive coastal areas that distinguish it from the developed urban beach parks of Lahaina, Kāʻanapali and Kapalua.

Honolua Bay and Līpoa Point are outside of the Maui Island Plan's growth boundaries, and the area provides a clear demarcation that separates the more urbanized and developed landscapes to the west from the more undeveloped, rugged and natural landscapes to the east. There is a strong ethos in the community to ensure the rural, country character of the area is protected.

The project area is accessed from the west by a historic, one-lane bridge constructed in 1924. The trail from the informal parking lot just west of the bridge to the rocky shore of Honolua Bay is through a forest of large,

mature trees covered with vines and other overlapping plants. The setting in the thick of this forested area is stunning. Driving further east from Honolua Bay along this narrow, curvy stretch of Honoapiʻilani Highway one reaches Kulaokaʻeʻa, a broad expanse of open space with sweeping views of Honolua Bay and Molokai. The westernmost extent of the project area overlooks the remote, rustic and mystical Honokōhau valley and bay. This area continues to support kalo cultivation and traditional Hawaiian cultural practices.

Maintaining the project area's unique sense of place and character in the face of increasing user demand and upland development will be a significant challenge over the planning period.

*Looking west across Kulaokaʻeʻa towards resort-like farm estates overlooking Honolua Bay, Maui.*

### 4.5 Management Complexity

Successful management of the project area may be complicated by the numerous governmental agencies that may have a role in managing the area. A host of separate divisions within the state DLNR as well as other State, Federal, and County agencies have different management roles and responsibilities. A diffuse management structure may complicate the development and implementation of integrated policy and programs to effectively manage the area. This, along with complicated and lengthy government hiring and procurement processes, could impede timely response to challenges such as sea level rise and resource overuse.

## 5.0 NEXT STEPS

### 5.1 Preparation of a Management Plan

#### 5.1.1 Management Plan Scope

The management plan should include the following elements: 1. A vision statement and guiding management principles; 2. Documentation of major threats and management issues; 3. A delineation of management roles and responsibilities; 4. Recommendations to manage human activities, restore and perpetuate cultural and natural resources, build resiliency, and upgrade infrastructure and facilities; and 5. An implementation and monitoring strategy.

Much of the above content can be derived through this repsort. However, the following information needs should be addressed prior to the preparation of the management plan:

1. Parking counts/analysis;
2. User survey;
3. Flora/fauna survey;
4. Drainage/sedimentation analysis;
5. Cultural resources scoping survey to include detailed historical research; and
6. Update of the 2007 Archaeological Inventory Survey (AIS) for lands within the project area as represented in TMK: (2)-4-1-001:010, and the preparation of a new AIS for areas not surveyed in the 2007 study.

#### 5.1.2 Management Plan Principles, Goals, Objectives, and Strategic Actions

The principle of resilience-based management is particularly appropriate for the project area. A resilience-based management plan considers both human and biotic needs with the intent to manage the ecosystem so that it can absorb disturbances (natural disasters, disease, influx of people, climate change, etc.) and continue to maintain its health (Fisher, 2017).

Management plan goals, objectives, and strategic actions should be constructed within the context of the project area's role in the Honolua and Honokōhau Ahupua'a. The symbiotic relationship of the project area to mauka and makai lands and waters should be recognized. Consideration should be given to the impact of management plan actions on the health of both the Honolua and Honokōhau Ahupua'a.

The management plan, and subsequent management actions, should be informed by the wisdom of the area's lineal and generational descendants, and the guidance that can be found in the Wahi Pana of the area.

The plan should build on the broad base of community interest and support for the preservation and proper management of the project area. There is broad support for the application of community-based management to the future care of the project area. Where feasible, programs to have the area's lineal and generational descendants, the Save Honolua Coalition, and other stakeholders involved in the management of the area will make plan implementation more durable.

**Goals, Objectives, and Strategic Actions**

As part of the effort to develop the Honolua Bay and Līpoa Point management plan, additional public consultation (in addition to what was done during the scoping process) should be conducted to establish a broadly held vision for the future of the project area. A series of broad goals, each supported by more specific objectives, and strategic actions should be formulated that together will implement the community's vision for the area.

The goal statements should describe a desirable future condition for the project area. The goal statements should be intentionally general; but should be attainable through concerted effort. Objectives should be more specific and may be regarded as milestones in the journey to achieve the larger goals. Strategic actions should be specific tasks, procedures, programs, or techniques to carry out the goals and objectives.

## 5.2 Selection of a Management Structure

There are several different policy approaches that could be pursued by the DLNR to manage the Honolua Bay and Līpoa Point project area. This section only briefly identifies and discusses various policy options. It is not designed to serve as a comprehensive legal or institutional analysis of each policy option. Additional input from agency and community stakeholders is needed prior to selecting a management structure. Such input can occur through the management plan-making process.

**Background**

The mission of the DLNR is to "enhance, protect, conserve, and manage Hawai'i's unique and limited natural, cultural, and historic resources held in public trust for current and future generations of the people of Hawai'i, and its visitors, in partnership with others from the public and private sectors" (Hawai'i Revised Statues §26-15). Through Title 13 of the Hawai'i Administrative Rules, the DLNR administers ten divisions to implement this mission, including: (1) the Division of State Parks (SP), responsible for planning, operating, and maintaining the 52 state parks and associated facilities; and (2) the Division of Aquatic Resources (DAR), responsible for managing the state's marine and freshwater resources, including establishing and managing the state's 11 Marine Life Conservation Districts.

In October 2014, the State of Hawai'i paid $19.8 million to acquire 244.12 acres of coastal lands at Līpoa Point from the ML&P. These lands, stretching from Honolua to Honokōhau, immediately abut the waters of Honolua Bay, which are managed by DLNR/DAR as part of the Honolua-Mokulē'ia MLCD. As documented by the local media and public record during community consultations held in relation to this land purchase, representatives from local families with lineal descent ties to the area, community groups, and local not-for-profit corporations all publicly expressed their support for the state's acquisition and their desire to participate in the future management of Honolua Bay and Līpoa.

Following the state's purchase of the project area, the project area has been managed by the DLNR's Land Division as unencumbered state land and will continue to be so managed until there is a disposition of the land to other DLNR Divisions.

During 2017 Planning Consultants Hawaii, LLC conducted a series of community and stakeholder focus group meetings; key informant interviews; and an open house to invite, document, and integrate public input to inform the future planning and management of the Honolua Bay and Līpoa Point project area. During these community consultations, participants identified several policy options for the long-term management of the Honolua Bay and Līpoa Point project area. The next section briefly presents these

various policy options with relevant considerations including which lead and partner agencies/organizations could be involved and the comparative policy and administrative attributes of each option.

**Discussion**

The traditional (default) approach to managing the project area is by the DLNR through Hawai'i Administrative Rules Title 13.

Under this approach, there would be a disposition of land to the appropriate DLNR agencies that would then be responsible for managing the coastal lands purchased at Līpoa Point, while the DAR would continue to manage the waters of Honolua Bay consistent with the rules and regulations of the Honolua-Mokulē'ia MLCD designation. Additional administrative support of the project area, and the MLCD, would be provided from other DLNR Divisions, such as: (a) the Division of Boating and Ocean Recreation (DBOR), with responsibility for the management and administration of statewide ocean recreation and coastal areas programs, including designated ocean recreation management areas and offshore mooring areas (including those located within Honolua Bay); (b) the State Historic Preservation Division, which has responsibility over historical, cultural, and archaeological resources and sites (including those found at Līpoa Point); and (c) the Division of Conservation and Resource Enforcement (DOCARE), with enforcement responsibility for all state laws and rules involving state lands, parks, historic sites, natural areas, and aquatic life (including in the project area).

During the 2017 community consultation process, some participants voiced their support of a management option that would make management of the area less reliant on the DLNR under the provisions stated within Title 13 of the Hawai'i Administrative Rules. Instead, conceptually, they identified four policy alternatives (options) that they believed may provide a more appropriate and effective approach for the long-term management of the Honolua Bay and Līpoa Point project area, as follows:

1. Designation of some, or all, of the lands purchased at Līpoa Point to be administered and managed day-to-day by a private land trust, either under the DLNR's oversight (via a long-term lease) or following a transfer of the deed (ownership) from state government to the land trust. While the *makai* waters of Honolua Bay would remain under the authority of DLNR/DAR, the private land trust could collaboratively partner with and support DAR and DOCARE in their efforts to administer and enforce the MLCD rules at the project site. Community/stakeholder representatives identified the Hawaiian Islands Land Trust (HILT) as possibly serving as the lead organization (a not-for-profit corporation) under such an arrangement, perhaps additionally supported by other private partners with land acquisition and management experience, including The Nature Conservancy of Maui and/or the Trust for Public Land. Community and stakeholder representatives additionally noted that under this management arrangement, the private land trust could pursue opportunities to purchase additional land parcels adjacent to the project area through financing made available by the Legacy Land Conservation Commission for the Acquisition of Resource Valuable Lands (HRS Chapter 173A).

2. Designation of some, or all, of the lands purchased at Līpoa Point to be administered and managed day-to-day by a community organization (not-for-profit corporation; IRS 501(c)(3) designation), under the DLNR oversight (via a long-term lease). While the *makai* waters of Honolua Bay would remain under the authority of DLNR/DAR, the community group could collaboratively partner with and support DAR and DOCARE in their efforts to administer and enforce the MLCD rules at

the project site. Community/stakeholder representatives identified the Save Honolua Coalition (SHC) as possibly serving as the lead organization (a not-for-profit corporation) under such an arrangement, perhaps additionally supported by other community groups with natural resource management experience, including the Maui Nui Marine Resource Council (MNMRC) and/or the Nature Conservancy of Maui. Community/stakeholder representatives additionally noted that under this management arrangement, the community group could also hold leases and management authority over a limited number of designated concessioners providing products and services to visitors on-site. Some participants at public/community meetings further suggested the creation of a new "Friends of Līpoa Point" community group (even without formal legal designation) that could help to improve relations between the residents of the Honolua/ Līpoa neighborhood areas and visitors coming to and using the site daily. This "Friends of Līpoa Point" group would support the lead/designated community organization as a local partner.

3. Creation of a public-private partnership (PPP) that would manage the Honolua and Līpoa Point lands and waters under a State/DLNR-sanctioned, legal collaborative co-management agreement, designating a coalition of public agencies (led by the DLNR as the statutory authority) and private entities (including interested and relevant not-for-profit corporations and community organizations). Under a PPP management arrangement, project area decision-making would be undertaken collaboratively through a co-management board, the members of which would consist of elected representatives from each of the designated PPP member agencies or organizations under the co-management agreement. Administrative, financing, and management responsibilities would be shared among the designated members of the co-management board.

4. Creation of a for-profit public-private partnership (PPP) that would manage the Honolua and Līpoa Point lands and waters under a State/DLNR-sanctioned, legal collaborative co-management agreement, designating a coalition of public agencies (led by the DLNR as the statutory authority) and private for-profit entities. Under a PPP management arrangement, project area decision-making would be undertaken collaboratively through a co-management board, the members of which would consist of elected representatives from each of the designated PPP member agencies or entities under the co-management agreement. Administrative, financing, and management responsibilities would be shared among the designated members of the co-management board.

Including the traditional approach, these four options have varying perceived advantages and disadvantages relating to management of the project area. A comparative summary of the lead actors, potential partners, and perceived management advantages and disadvantages for each of the four policy options are presented in Table 3.

None of the policy options outlined would reflect a significant departure from current DLNR policy and practice at other sites throughout the State of Hawai'i and would be implemented consistent with current state policies and processes. All three options would not only advance the mission of the DLNR in the project area, but also would further encourage public engagement and support from key constituencies while demonstrating the DLNR's careful consideration and responsiveness to public input provided by knowledgeable stakeholders and members of the local community.

| *Category* | *Type* | *Lead* | *Partners* | *Management Advantages* | *Management Disadvantages* |
|---|---|---|---|---|---|
| **Public** | State Government | DLNR; existing Division co-mgmt: i.e., State Parks; DOFAW; Land Division; Aquatic Resources | Statutory: BLNR<br>Optional: private contractors/firms | ▪ Current management model (no policy change)<br>▪ Legal/statutory authority<br>▪ Political support (legislative; executive)<br>▪ Existing federal agency relationships and support<br>▪ Located within State's administrative center | ▪ Dependent on government processes, personnel<br>▪ Longer lead time for response and adaptation<br>▪ Limited financing and human resource capacity<br>▪ Inconsistent to low degree of on-site presence<br>▪ Less mauka / makai management integration<br>▪ Variable relations and support from local community and key stakeholders |
| **Private** | Land Trust | Potential: Hawaiian Islands Land Trust (HILT) | Optional: The Nature Conservancy; the Trust for Public Land; public and private donors | ▪ Proven record of effective land management and conservation in Maui County, statewide<br>▪ Increased degree of on-site presence<br>▪ Enhanced funding opportunities<br>▪ Multiple revenue streams; tax exempt (501(c)(3))<br>▪ More rapidly responsive and adaptive to change<br>▪ Expanded human resource capacity<br>▪ Positive relations and frequent interaction with local community and stakeholders | ▪ Reliance on consistent donor funding within a competitive and limited private funding market<br>▪ Reduced governmental agency support (land)<br>▪ Need for effective governmental coordination and communications (e.g., DAR for MLCD)<br>▪ Reliance on strong financial management capacity<br>▪ Reliance on strong administrative and operational human resources capacity (including on-site) |
| **Private** | Community nonprofit organization | Potential: Save Honolua Coalition (SHC) | Optional: Maui Nui Marine Resource Council (MNMRC); HILT; Friends of Līpoa Point | ▪ High or full degree of on-site presence<br>▪ Enhanced funding opportunities<br>▪ Multiple revenue streams; tax exempt (501(c)(3))<br>▪ More rapidly responsive and adaptive to change<br>▪ Expanded human resource capacity<br>▪ Strong relations and consistent support from local community and stakeholders | ▪ Reliance on consistent donor funding within a competitive and limited private funding market<br>▪ Reduced governmental agency support (land)<br>▪ Need for effective governmental coordination and communications (e.g., DAR for MLCD)<br>▪ Limited financial management capacity<br>▪ Limited human resources/technical capacity |
| **Mixed** | Public-Private Partnership | Consortium (partnership) | Statutory: DLNR<br>Potential: HILT; SHC; MNMRC | ▪ Multiple revenue streams available<br>▪ Increased, interdisciplinary technical capacity<br>▪ Integrated governmental agency support (land/sea)<br>▪ Collaboration encourages regular governmental agency communications and support<br>▪ Potential for strong public/local community support | ▪ Management of multiple actors and expectations<br>▪ Increased administrative complexity<br>▪ Collaborative decision-making process requires additional time, resources<br>▪ Limited successful case studies in Hawai'i (e.g., Pūpūkea-Paumalū State Park Reserve) |
| **Mixed** | For Profit | Consortium (partnership) | Statutory: DLNR<br>Private Entities | ▪ Multiple revenue streams available<br>▪ Potential funding benefits for broader DLNR programs<br>▪ Expanded human resource capacity<br>▪ Potential community-based economic development and employment generation | ▪ Public perception<br>▪ Externalities and spillover effects<br>▪ Limited public access<br>▪ Potential overuse of resources<br>▪ Increased stakeholder conflicts |

**Table 3:** A comparitive summary of the various actors (leads and partners), advantages, and disadvantages between the five policy options the DLNR could pursue in managing the Honolua Bay and Līpoa Point project area, as identified by stakeholders during a 2017 consultative process.

## 5.3 Preparation of an Environmental Assessment (EA) and Analysis of Potential Permitting

An EA document will likely be required to implement the management plan. HRS Chapter 343 is triggered when using state funds, or when a proposed action occurs within a conservation district or shoreline setback area. HRS Chapter 343 and its associated rules for implementation, provide significance criteria upon which to evaluate a proposed action. These significance criteria are described in Section 12 of the Administrative Rules, Title 11, Chapter 200: Environmental Impact Statement Rules. The level of significance of the proposed action's potential to impact a resource is determined based on the evaluative criteria provided in the rules. The outcome of the evaluation is that the potential impact of the proposed action is anticipated to be "not significant", "less than significant", "mitigated to less than significant", or "significant". However, the rules also provide categories of actions that are exempt from further environmental review because their impact, and prudent measures to avoid, minimize or mitigate adverse impacts, are well established and known. The DLNR has a list of exemptions approved by the Environmental Council on June 5, 2015. The DLNR Exemption List establishes ten exempt classes of actions: These include:

| EXEMPTION CLASS | EXEMPTIONS |
|---|---|
| **1** | Operations, repairs or maintenance of existing structures, facilities, equipment, or topographical features, involving negligible or no expansion or change of use beyond that previously existing. |
| **2** | Replacement or reconstruction of existing structure and facilities where the new structure will be located generally on the same site and will have substantially the same purpose, capacity, density, height, and dimensions as the structure replaced. |
| **3** | Construction and location of single new, small facilities or structures and the alteration and modification of same and installation of new, small, equipment and facilities and the alteration and modification of same including but not limited to: (A) Single family residences not in conjunction with the building of two or more such units; (B) Multi-unit structures designed for not more than four dwelling units if not in conjunction with the building of two or more such structures; (C) Stores, offices and restaurants designed for total occupant load of twenty persons or less, if not in conjunction with the building of two or more such structures; and (D) Water, sewage, electrical, gas, telephone, and other essential public utility services extensions to serve such structures or facilities; and (E) accessory or appurtenant structures including garages, carports, patios, swimming pools, and fences. |
| **4** | Minor alteration in the conditions of land, water, or vegetation. |
| **5** | Basic data collection, research, experimental management, and resource evaluation activities which do not result in a serious or major disturbance to an environmental resource. |
| **6** | Construction or placement of minor structures accessory to existing facilities. |
| **7** | Interior alterations involving things such as partitions, plumbing, and electrical conveyances. |
| **8** | Demolition of structures, except those structures located on any historic site as designated in the National Register or Hawai'i Register as provided for in the National Historic Preservation Act of 1966, Public Law 89-665, or Chapter 6E, Hawai'i Revised Statutes. |
| **9** | Zoning variances except shoreline setback variances. |

| EXEMPTION CLASS | EXEMPTIONS |
|---|---|
| | |
| **10** | Continuing administrative activities including, but not limited to, purchase of supplies and personnel-related actions. |

Many management plan recommendations may fall within the exempt categories of action and therefore may not be subject to the preparation of an EA or EIS.

However, the management plan may propose actions that are not exempt and therefore will require the preparation of an EA and/or EIS. Non-exempt actions might include grubbing or grading where a building permit is required, new driveways that increase use and access or areas of parking for more than 25 vehicles. The management plan will clearly define the scope of the its actions and define the necessary HRS Chapter 343 environmental review that is required.

The scope and cost of an EA or EIS is a function of the project itself and the potential impacts that the action might have upon environmental, natural, and cultural resources as well as infrastructure and public facility systems. Studies that might be required of an EA or EIS could include: land use, civil engineering and architectural plans; preliminary engineering and drainage reports; fiscal impact assessment; cultural impact assessment; archaeological inventory survey; flora fauna surveys; traffic impact analysis report; agricultural impact assessment; and topographic surveying. Thus, the cost of an EA or EIS will vary widely depending upon the availability of data to document project impacts as well as the scale and nature of the project and the sensitivity of the location to be impacted.

Given the considerations described above, an EA or EIS to support the implementation of a management plan for the state lands at Honolua Bay and Līpoa Point could include the following consultants and associated scope:

| Consultant | Scope |
|---|---|
| **Planner** | Prepare and process the EA; draft sections of the report; conduct community scoping/outreach; respond to agency and community comments; project coordination and management of the project |
| **Traffic Consultant** | Prepare a traffic impact analysis report |
| **Civil Engineer** | Prepare a preliminary engineering and drainage report |
| **Surveyor** | Prepare a survey of the areas to be improved |
| **Landscape Architect / Civil Engineer** | Prepare a conceptual land use and engineering plan of improvements |
| **Cultural Consultant** | Prepare a cultural impact assessment report |
| **Project Team (Planner, Engineer, Cultural, etc.)** | Prepare for, and attend, BLNR meetings for EA approval. |

The management plan will identify future land uses, activites, and improvements that may require land use and environmental permitting prior to implementation. The scope of future required permitting should be considered as the management plan is prepared. Appendix A provides an assessment of potential permitting needs for the sixteen improvements identified on Figure 35 of this report. This analysis should be updated concurrent with the preparation of the management plan.

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**APPENDIX A:**
**Preliminary Permitting Assessment of Identified Stakeholder Preferences**

Sixteen conceptual improvements were identified by two or more charrette teams during the July 2017 facilitated stakeholder meetings. The charrette teams represented a diverse range of Līpoa Point stakeholders. The broad geographic location of the various improvements is identified in Figure 35 on page 88. *It shouldn't be construed that the* improvements *discussed in this section, and depicted on Figure 35, are supported by the DLNR or Planning Consultants Hawai'i, LLC.*

The purpose of this section is to provide a preliminary assessment of the potential permitting requirements for the stakeholder proposed improvements identified on Figure 35. *As more detailed information is obtained about potential* improvements *both additional research and vetting through state and county agencies will be required to confirm permitting requirements*.

While this assessment of each improvement is done individually, it is noted that secondary and cumulative impacts of all actions taken together should be assessed to see if they warrant additional permitting or an environmental assessment.

Most of the improvements require nominal regulatory permitting depending on the scale or impact of the proposed action. Table A-1 provides a preliminary assessment of the potential permitting requirements for the sixteen conceptual improvements. A half-dozen improvements were suggested for the Honolua Bay area, eight improvements for Līpoa Point and its fallow fields, and two improvements were recommended for the Keonehelele'i Beach section of the project area. Most of the improvements would be allowed by obtaining straight forward permit approvals from the County Planning Department and/or the State DLNR OCCL. Three of the improvements identified are more complex than they appear from a permitting standpoint and could involve a lengthier and more rigorous process. These include constructing an educational hale, installing toilets, and re-grading or re-orienting the Līpoa Point Access Driveway along the edge of the pali or cliff line.

**Permitting**

In general, any structural improvements require permits from the County and/or the State DLNR, both of which regulate the "use" of lands. County Special Management Area (SMA) and Shoreline Rules also regulate activities that have the potential to pollute or negatively affect nearshore marine waters and coastal resources. The DLNR OCCL regulates "land uses" in the conservation district using a system of consecutively more complex permits. These start with simple administrative management plan or site plan approvals, to department approvals that may require additional studies or documentation, to Board of Land and Natural Resources (BLNR) approvals that may involve public discourse on the matter. The DLNR may also require a right-of-entry to work on its project area, whether it is designated agriculture or conservation. Maui County requires ministerial permits such as building, electrical, plumbing, grading and/or flood permits on state lands, except when superseded by DLNR OCCL regulations in the conservation district (HRS 205-5).

Installation of signage for safety or education is generally not regulated as a use of land, and thus DLNR OCCL and County SMA permits would generally not be required. Large concrete slabs for walkways or for signage could trigger the need for permits, depending on the size of ground disturbance. For example, pouring concrete for walkways or stairs may require a variance from regulatory prohibition if located within the county shoreline setback area (i.e., within 150 feet of the shoreline). Management intervention

methods, such as limiting the days or hours of an area's use, instituting target audience education or user fees, collecting non-resident parking fees, or creating periods of non-use or restricted access, are generally not regulated through land use permitting.

All work on the project area would trigger compliance with HRS 343 relative to environmental review. Triggers could include the use of state lands, use of state or county funds, uses within the conservation district, and/or uses within the shoreline setback area. However, most of the improvements could be determined by the lead permitting agency to be exempt from the preparation of an environmental assessment (EA). For example, the DLNR has a published list of activities the agency typically finds to be EA exempt. In addition, many of the improvements meet or adhere to one or more of the exempt classes of action provided in HAR 11-200-8. EA exemption determinations are normally made by an agency in conjunction with the discretionary permitting process.

| PRELIMINARY PERMITTING ASSESSMENT | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **Type of State or County Permit Required** X = required | | | | | | | | **Preliminary Assessment** |
| | | **State** | | | **County** | | | | | |
| Item | Proposed Action or Improvement *Actions that may not be EA exempt | Conservation District Use Permit | C.D. Department Approval | C.D. Site Plan Approval | Grading / Grubbing Permit | SMA Major | SMA Minor | SMA Exempt | Shoreline Setback Approval | |
| | **Honolua Bay / Valley** | | | | | | | | | |
| 1 | Purchase the abutting 9.1 acre parcel owned by ML&P. | | | | | | | | | This action alone would not require permits. However, if the purchase involved the expenditure of state funds or monies it would trigger the application of HRS Chapter 343 Environmental Review. However, purchasing additional land for conservation purposes would likely be exempt from the preparation of an environmental assessment. The BLNR would make the determination (i.e., EA Exempt). |
| 2 | Remove the informal parallel parking along Honoapi'ilani Highway. | | | | | | | | | The State of Hawai'i Department of Transportation (HDOT) could prohibit parking along the shoulder of the Highway. HDOT could install no-parking signs, and use pavement striping, to inform the public that parking along the highway is not permitted. This action wouldn't require permits. |
| 3 | Trim trees along the Honolua Bay Access trail. | | | | | | | | | ***State Permitting:*** Honolua Bay's access trail is within the State Conservation District Resource sub-zone. According to the State's Conservation District Rules Section 13-5-22 (HAR), tree pruning generally doesn't require a permit (P-13, A-1 and B-1), but may require a Site Plan Approval depending on scale. Removing trees that are dead, diseased, or that are a public safety hazard do not require a permit (P-11, A-1, A-2). But selective tree removal (P-11, B-1), or landscaping (L-2, B-1 and C-1), could require a Site Plan Approval from the DLNR OCCL. **County Permitting:** Tree trimming doesn't require county permits. However, minor activities, such as mechanical grubbing of vegetation or grading that changes topography by two feet or more would trigger county SMA permit requirements. |
| 4 | Restore native habitat in partnership with community groups including the planting of Kalo and new Lo'i. | | | X | | | | | | ***State Permitting***: The planting of kalo does not require permits. However, constructing new lo'i walls or terraces, and/or redirecting stream flow into lo'i through canals or channels could require approvals from the DLNR OCCL, Land Division, and/or the Commission on Water Resource Management. Restoring native habitat and removing invasive species is generally allowable without a permit (HAR 13-5-22, P-4, A-1). However, such plans may require and/or benefit from obtaining a Site Plan Approval (B-1) depending on the scale and nature of the action. ***County Permitting:*** Habitat restoration and kalo cultivation wouldn't require county permits. However, more extensive restoration or Lo'i cultivation that includes minor activities, such as mechanical grubbing of vegetation, grading that changes topography by two feet or more or moves 50 cubic yards or more of cut and/or fill would trigger these permits. Terraces that exceed 4 feet in height could trigger building, grading and/or SMA/Shoreline permits. |
| 5 | Construct a Hawaiian hale-style culture and marine education facility/pavilion. | Scale dependent | X | | X | | X | | X | ***State Permitting***: Conservation District Rules HAR 13-5 may restrict the type, location, or limit the size of an educational hale. As such, the DLNR's Engineering Division should be consulted as they host the National Flood Insurance Program for the State of Hawai'i. ***Maui County Permitting:*** Maui County established procedures for designing and constructing indigenous Hawaiian architectural structures, such as a hale or pavilion, at Maui County Code (MCC) 16.26B.3800. The number and types of permits required would depend on the structure's size, it's method of construction and materials used, as well as its location. Most of the valley leading to Honolua Bay is within a flood hazard zone (V, AE, A or X) as described in Section 5.4 of this report and Figure 19. Maui County regulates construction in flood zones through its Flood Development Permit (FDP) program pursuant to MCC Title 19.62. |
| 6 | Install new compostable or portable toilets*. | | X | | X | | X | | Not allowed | ***State Permitting:*** Permanent restrooms can involve significant permitting and infrastructure requirements such as a dedicated water supply, electricity, septic tank and a leach field which must be located more than 55 feet inland of the shore according to State Department of Health Individual Wastewater System regulations. Vault-type comfort stations, such as those used at Hosmer's Grove on Haleakala, have considerably less infrastructure requirements because they do not need electricity or running water. Compostable toilets or waterless toilets often require a vault for composting. However, underground vault systems can be inundated by rising waters in low-lying drainages or A or AE flood prone areas. Wastewater pipes, connections, and components can be damaged by waves, storm surge, erosion and debris when located in a V or VE flood zone. Should these wastewater containment systems be compromised, they can lead to water pollution and contamination of nearshore areas. The southeastern side of Honolua Bay is within the V zone and the northwestern side is within the AE zone. The current port-a-potties next to the largest parking lot at Honolua Bay are in the A flood hazard zone, which is one of the higher spots on the project area within the valley. The portable toilets are held down with spikes to resist floatation, but their containment systems could be inundated if flood waters rose above the seats, thus risking contamination of the surrounding area and its waters. Plastic port-a-potties would require DLNR OCCL approval. They would also require compliance with HRS Chapter 343, but could be deemed exempt from the preparation of an environmental assessment. Placement in the V flood hazard zone should be avoided, but other locations near the back/mauka extent of the project area or along the edge of the valley's hillside might be feasible. These areas are in Flood Zones AE, A, and X, which respectively represent lower flood risk areas. Locations that are more than 16 feet above sea level are preferable, because they are above base flood elevation. A detailed survey and an elevation certificate should be obtained for the higher mauka portions of the project area inland of Honolua Bay. This would help identify areas at low risk of flooding that could serve as sites for new or improved toilets. |

| PRELIMINARY PERMITTING ASSESSMENT | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | **Type of State or County Permit Required** X = required | | | | | | | | **Preliminary Assessment** |
| | | **State** | | | **County** | | | | | |
| Item | Proposed Action or Improvement *Actions that may not be EA exempt | Conservation District Use Permit | C.D. Department Approval | C.D. Site Plan Approval | Grading / Grubbing Permit | SMA Major | SMA Minor | SMA Exempt | Shoreline Setback Approval | |
| | | | | | | | | | | ***County Permitting:***<br>Port-a-potties are not recommended within 150 feet of the shoreline, as that would trigger a requirement for a Shoreline Setback Approval. Plastic port-a-potties would also require a County SMA approval. |
| | **Līpoa Point / Kulaokaʻeʻa** | | | | | | | | | |
| 7 | Grade and slope the access driveway to Līpoa Point*. | Scale dependent | X | | | If large scale | X | | X | ***State Permitting:***<br>The access driveway is an existing use in, or at the edge of, the Conservation District Limited Subzone. Major improvements could require BLNR approval of a Conservation District Use Permit. Moderate improvements, such as those that do not increase the size of the roadway by more than 50%, could be authorized with a DLNR OCCL Permit, whereas minor improvements (less than 10%) could be allowed with a Site Plan Approval (13-5-22, P-8). Landscaping (which includes grubbing and grading) that exceeds 2,000 sf could require a DLNR permit, whereas landscaping more than 10,000 sf would require BLNR approval of a Conservation District Use Permit (13-5-23, L-2, D-1). Grading of more than one acre could require a National Pollution Discharge Elimination System (NPDES) permit from the State Department of Health.<br><br>The work would also require compliance with HRS Chapter 343 relevant to environmental review, but could be determined as exempt depending on the scale of the work and/or the type of surface improvements proposed.<br>***County Permitting:***<br>A County SMA permit, County Shoreline Setback Approval, and County Grading Permit would be required to improve the existing access driveway. Grading within the agriculturally-designated portion of the project area would require County SMA, and possibly Shoreline Setback approval, if it was within 150 feet of the shoreline. |
| 8 | Place boulders and/or a post and rope barrier along the cliff instead of guardrails. | | If < 10,000 sf | If < 2,000 sf | | | | X | X | ***State Permitting:***<br>Any landscaping, grading, or grubbing that exceeds 2,000 sf could require a DLNR permit, whereas if it exceeds 10,000 sf it would require BLNR approval of a Conservation District Use Permit (13-5-23, L-2, D-1).<br>***County Permitting:***<br>Placing barriers along the edge of the Lipoa Point access driveway would require nominal permitting. Based on an SMA assessment application, such activities would normally be granted an SMA Exemption or SMA Minor Permit, Shoreline Setback Approval, and Environmental Assessment Exemption by Maui County. These approvals are typically granted simultaneously with one another, and the application should spell out best management practices to be implemented. |
| 9 | New compostable or portable toilets. | | | | X | | | X | | Installing new compostable or portable toilets are discussed in detail above (i.e., Item #6). Permitting is considerably easier in the agricultural district as opposed to the conservation district. Permitting is also easier in areas not subject to flooding such as high plateaus.<br>***State Permitting:***<br>DLNR OCCL approvals would be required in the conservation district, which mainly consists of the pali and sloping areas of Līpoa Point.<br>***County Permitting:***<br>A County SMA permit would be required. Compliance with HRS 343 relative to environmental review would also be required, but compostable or portable toilets would likely be considered exempt activities. |
| 10 | New portable toilets. | | | | | | | X | | Please see items 6 and 9. |
| 11 | Partner with community groups to restore plant and bird habitat. | | X | X | Scale dependent | | | Scale dependent | X | ***State Permitting:***<br>Partnering with community groups to restore plant and bird habitat is generally supported within the conservation district, which includes the pali and sloping areas of the project area. Restoring native habitat and removing invasive species is allowable without a permit (HAR 13-5-22, P-4, A-1) in the conservation district, but may require and benefit from obtaining a Site Plan Approval (B-1) depending on the scale and nature of the action. No state permit is required for native habitat restoration in the agricultural district (i.e., fallow fields) inland of Līpoa Point, except for a right-of-entry.<br><br>Near Punaha Gulch, habitat restoration is generally supported within the conservation district. All the project area within the Punaha Gulch is within the Limited Subzone of the conservation district. Restoring native habitat and removing invasive species is allowable without a permit (HAR 13-5-22, P-4, A-1), but may require and benefit from obtaining a Site Plan Approval (B-1) from the DLNR OCCL. Landscaping an area of less than 2,000 sf could require a Site Plan Approval or a DLNR Permit would be required if landscaping up to 10,000 sf (13-5-23, L-2) in the Limited Subzone.<br>***County Permitting:***<br>County SMA permits would be necessary if landscaping or irrigation are involved, or if grading exceeds one acre, changes the grade by more than two feet in elevation, or involves more than 50 cubic yards of cut and/or fill. For restoration activities along the pali, or involving trails down or along the pali, a County Shoreline Setback Approval should be obtained since the Shoreline Rules for the Maui Planning Commission explicitly define minor activities and minor structures allowed in the setback area (12-203-4), and provides criteria for their approval (12-203-9). Both SMA and Shoreline Rules promote the use of best management practices to reduce soil erosion, and prevent deposition of sediment into nearshore waters. The best management practices should be spelled out in any SMA/Shoreline application. For restoration activities near Punaha Gulch, an SMA Exemption or SMA Minor Permit and an associated Shoreline Setback Approval should be obtained from the county. |

| PRELIMINARY PERMITTING ASSESSMENT | | | | | | | | | | |
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| | | **Type of State or County Permit Required** X = required | | | | | | | | **Preliminary Assessment** |
| | | **State** | | | **County** | | | | | |
| Item | Proposed Action or Improvement *Actions that may not be EA exempt | Conservation District Use Permit | C.D. Department Approval | C.D. Site Plan Approval | Grading / Grubbing Permit | SMA Major | SMA Minor | SMA Exempt | Shoreline Setback Approval | |
| 12 | Enhanced coastal wilderness / nature trail. | | X | X | | | X | | X | ***State Permitting:*** Maintenance of existing coastal wilderness/nature trails would generally be allowable. Creation of a new or enhanced coastal trail may trigger an SMA permit if it would increase the use of coastal lands. Work on conservation land that doesn't expand the "land use" by more than 10% (minor) or 50% (moderate) may be authorized through a Site Plan Approval or Department Permit, respectively. However, the BLNR and department reserve the right to require a BLNR approval and compliance with HRS Chapter 343 Environmental Assessment requirements for any land use within the conservation district that could potentially have an adverse impact on resources. ***County Permitting:*** A County SMA Exemption and Shoreline Setback Approval could be issued for non-structural improvements to the trail after submittal of an SMA assessment application. Small or minor changes in pathways, such as drainage improvements or stability enhancements using spiked wood or trex recycled materials would generally be found exempt, and not require a County SMA permit unless they involved poured concrete, earth moving, or grading. |
| 13 | Enhanced coastal access trail. | | | | Parking | | X | | | Creation of a new or enhanced coastal access trail from Honoapi'ilani Highway may trigger an SMA permit if it would increase the use of coastal lands. An existing paved driveway stub and metal gate are in the mid-portion of the Kulaoka'e'a plateau on the mauka side of the highway. This access could be expanded to accommodate safer parking or site access. Although compliance with Chapter 343 relating to environmental review would be required during the SMA permitting process, making minor safety or trail improvements along the former roadway that led to the cane fields could be construed as an exempt activity per HAR 11-200-8. |
| 14 | Soil remediation, sustainable agriculture and/or native tree reforestation. | | | | | | | | | Soil remediation and sustainable agriculture on the Kulaoka'e'a plateau would not require any "use" permits given the land is intended for agricultural use. Please see item 11 for a discussion of the county SMA permits that may be required for native tree reforestation. |
| | **Keonehelele'i** | | | | | | | | | |
| 15 | New compostable or portable toilets. | | X | X | | | X | | X | New compostable, portable, or permanent vault-type toilets near Keonehelele'i Beach would require authorization by the DLNR OCCL and a county SMA permit. The type and size of the restroom could influence the type of permitting required, for instance a facility costing less than $500,000 could potentially receive an SMA Minor Use permit, provided it resulted in no adverse impacts. This area is within the Conservation District Limited Subzone, and is subject to its restrictions (13-5-23). In addition, facilities should be located more than 150 feet inland and outside of the shoreline setback area. To reduce the risk of flooding, the facilities should be placed at a site that is more than 21 feet in elevation above sea level (See Subsection 2.4.4 & Figure 20). A full discussion of restroom facilities is provided under items 6, 9 and 10 in the preceding section. |
| 16 | Improved driveway and parking using a permeable surface access*. | Scale dependent | X | | | If large scale | X | | X | ***State Permitting:*** Improved driveway access and parking improvements at Keonehelele'i Beach would involve similar permitting requirements as regrading or reorienting the Līpoa Point Access Driveway (Item #7 in the preceding section). This portion of the project area is within the Conservation District Limited Subzone (13-5-23), and the access driveway is an existing use. Major improvements could require BLNR approval of a Conservation District Use Permit. Moderate improvements, such as those that do not increase the size of the roadway by more than 50%, could be authorized with a DLNR OCCL Department Permit, whereas minor improvements (less than 10%) could be allowed with a Site Plan Approval (13-5-22, P-8). Landscaping (which includes grubbing and grading) that exceeds 2,000 sf could require a department permit, whereas landscaping more than 10,000 sf would require BLNR approval of a Conservation District Use Permit (13-5-23, L-2, D-1). ***County Permitting:*** Portions of the dirt road to Keonehelele'i Beach and its extension to various campsites are within the flood zone and shoreline setback area. A county SMA Minor Permit, Shoreline Setback Determination or Approval, and a Grading Permit or Grade Check Form would be required to improve the existing access road or create additional parking spots. As the site is within the conservation district and county zoning does not apply, a county Flood Development Permit would not be required but avoidance of flood or erosion prone areas is highly recommended. At the Planning Director's discretion, altering the roadway surface porosity, or significantly expanding its footprint, could trigger a more thorough review, such as an SMA Major Use Permit and associated impact studies or public discourse. |

**Table A-1:** Preliminary Permitting Assessment