

3.0 STATE LANDFILL CRITERIA EVALUATION

3.1 INTRODUCTION

This SLCE re-evaluates the locations of the following eight previously identified potential County of Kaua'i (County) MSWLF sites with respect to regulatory and other exclusionary criteria:

- Kalepa
- Kekaha Mauka
- Kipu
- Koloa
- Kumukumu
- Ma'alo
- Pu'u O Papai
- Umi

The eight sites were first identified as potential locations for a new Kaua'i MSWLF in two studies by consultant Earth Tech, Inc.: the *Kaua'i Municipal Solid Waste Landfill Siting Study* (Earth Tech 2001) and *New Kaua'i Municipal Solid Waste Landfill Kalepa Site Evaluation* (Earth Tech 2002). (The Kalepa site was made available after Earth Tech [2001] was published and was evaluated separately). The initial part of those studies identified areas where a new MSWLF should not be situated according to a set of exclusionary criteria to determine areas that cannot be feasibly used, are restricted by regulatory requirements, would be harmful to human health or the environment, or were otherwise undesirable. This current evaluation updates that island-wide evaluation (Earth Tech 2001, Section 2.0) using current data, to verify whether the eight sites remain viable locations for siting a MSWLF.

3.2 EXCLUSIONARY CRITERIA

Two categories of exclusionary criteria were used to eliminate from consideration areas on the island of Kaua'i where it would be best not to site a MSWLF.

The State of Hawai'i regulations for MSWLF siting, HAR §11-58.1-13, provide the primary set of exclusionary criteria used to delineate areas where it is best not to site a MSWLF. The HAR §11-58.1-13 criteria include:

- Areas within 10,000 ft of airport runways
- 100-year floodplains and floodways
- Wetlands
- Fault areas
- Seismic impact zones
- Unstable areas
- Tsunami inundation areas

In addition to the HAR §11-58.1-13 criteria, the following areas were excluded, for engineering, environmental, cultural, or other reasons:

- Special management areas
- Areas within 1,000 ft of shoreline
- Federal Government lands
- Areas with undesirable topography, i.e. slope > 33.33 degrees
- Areas within 300 ft of perennial streams
- State conservation lands
- Areas within 0.5 mile of urban lands
- Areas within 1,000 ft of potable surface water or groundwater sources

The criteria are further discussed in the evaluation results in Section 3.4.

3.3 GIS METHODOLOGY

A GIS was used to update the initial 2001/2002 island-wide evaluation for the eight identified sites. A GIS is a computer software system that allows storage, manipulation, and display of spatial and tabular data to conduct complex spatial analysis to arrive at an informed decision. ESRI ArcGIS version 10.0 was used to create maps displaying areas excluded from consideration for siting a MSWLF by applying the criteria listed in Section 3.2, using current data obtained from a variety of Federal, State, and Country sources. Together, these areas are termed exclusion zones.

3.4 ISLAND-WIDE EVALUATION

Results of applying the exclusionary criteria (Section 3.2) to the island of Kaua'i are illustrated on Figure 3-1 through Figure 3-9. The merged exclusion zones, potential wetland areas not in the exclusion zones, and the locations of the eight potential landfill sites are shown on Figure 3-11.

3.4.1 Special Management Areas

Special Management Areas (SMAs) are sensitive areas that have been protected by legislation, administration, or other agencies or organizations. To eliminate risk of damage to a known sensitive area, these areas were excluded from consideration (Figure 3-1). The SMA exclusion zone was produced using the SMA layer (sma.shp) downloaded from the Hawai'i State Office of Planning GIS Program Downloadable Layers web page (State of Hawai'i Office of Planning, Planning Division, Hawaii Statewide Planning and GIS Program at <http://hawaii.gov/dbedt/gis/download.htm>) on August 3, 2011.

3.4.2 Areas within 1,000 feet of the Shoreline

To protect the sensitive shoreline area, all areas within 1,000 ft of the shoreline were excluded from consideration (Figure 3-1).

3.4.3 Tsunami Inundation Areas

All areas within tsunami (tidal wave) zones were excluded from consideration. The Tsunami Inundation Area exclusion zone layer (tsunevac.shp) was downloaded from the Hawai'i State Office of Planning GIS Program Downloadable Layers web page on August 3, 2011 (Figure 3-2).

3.4.4 Fault Areas

According to HAR §11-58.1-13(d), it is best not to locate a landfill “within two hundred feet (sixty meters) of a fault that has had displacement in Holocene time.” There is some faulting on Kaua'i; however, none of these faults have evidence of movement during the current (Holocene) epoch. Therefore, no Fault Area exclusion zone is mapped on Kaua'i.

3.4.5 Seismic Impact Zones

All of the island of Kaua'i is categorized as seismic zone 1, and MSWLFs are permitted in seismic zone 1. Therefore, no Seismic Impact exclusion zone is mapped on Kaua'i.

3.4.6 Federal Government Lands

Federal Government lands exclusion zones have been mapped because of the difficulty of acquisition. Federal Government lands were identified by downloading the Government-owned land layer (gov_own.shp) from the Hawai'i State Office of Planning GIS Program Downloadable Layers web page on August 3, 2011, and selecting the records that listed the major owner as “Government Federal” (Figure 3-3).

3.4.7 Areas within 100-year Floodplains

Prior to construction, MSWLF owners must demonstrate that a proposed site will not restrict the flow of a 100 -year flood, reduce the temporary water storage capacity of the floodplain, or result in washout of solid waste. To eliminate the risk caused by siting a MSWLF within a 100-year floodplain, all such areas were excluded from consideration. The exclusion zone was produced using the digital flood layer (dfirm.shp) downloaded from the Hawai'i State Office of Planning GIS Program Downloadable Layers web page on August 4, 2011. All areas classified as Zone A, Zone AE, Zone AH, Zone AO, Zone VE, or as a floodway were combined to produce the 100-year floodplain exclusion zone (Figure 3-4).

3.4.8 Areas within 300 Feet of Perennial Streams

Perennial streams were identified using the Hawai'i Department of Land and Natural Resources, Division of Aquatic Resources stream database layer (darstreams.shp), downloaded from the Hawaii State Office of Planning GIS Program Downloadable Layers web page on August 4, 2011. For protection of water resources, a 300 -ft exclusion zone was drawn around streams classified as perennial to produce the exclusion zone (Figure 3-5).

3.4.9 Areas with Undesirable Topography

As part of applying the HAR §11-58.1-13 unstable areas exclusionary criterion, areas with slopes steeper than 3:1 (horizontal:vertical, H:V) were eliminated from consideration. A 10 meter by 10 meter horizontal resolution digital elevation model (DEM) was downloaded from the University of Hawai'i's School of Ocean and Earth Science and Technology (SOEST) Coastal Geology Group, DEM Imagery for Kauai web page (<http://www.soest.hawaii.edu/coasts/data/kauai/dem.html>) on August 10, 2011. An estimate of the slope was calculated from the DEM using the ArcGIS spatial analyst extension, and all areas with a calculated slope steeper than 3:1 were included in the Undesirable Topography exclusion zone (Figure 3-6).

Further site-specific analysis of potential unstable areas, including geotechnical investigations, will be conducted once a proposed MSWLF site is selected.

3.4.10 State Conservation Lands

Areas designated as State conservation lands were removed from consideration. The State Land Use Districts layer (slud.shp) was downloaded from the Hawai'i State Office of Planning GIS Program Downloadable Layers web page on August 15, 2011. All features corresponding to

Conservation Land Use District (i.e., code "c") were included in the State conservation land exclusion zone (Figure 3-7).

3.4.11 Areas within 0.5 Mile of Urban Lands

To minimize impacts on populated areas, areas within 0.5 mile of urbanized lands were removed from consideration. The State Land Use Districts layer (slud.shp) was downloaded from the Hawai'i State Office of Planning GIS Program Downloadable Layers web page on August 15, 2011. All features corresponding to Urban Land Use District (i.e., code "U") were selected, and a 0.5-mile buffer was drawn to produce the exclusion zone (Figure 3-8).

3.4.12 Areas within 10,000 Feet of Airport Runways

Due to potential bird hazards, areas within 10,000 ft of any airport runway end used by turbojet aircraft were added to the exclusion zone. MSWLF owners proposing a site within a 5-mile radius of any airport runway end must notify the affected airport and the Federal Aviation Administration (HAR §11-58.1-13(a)(3)). Three airport runways (Lihue, Princeville, and Pacific Missile Range Facility Airports) were identified as runways meeting the HAR criteria. A 10,000-ft buffer was drawn outside the digitized airport runways to produce the exclusion zone (Figure 3-9).

MSWLFs cannot be established within 6 miles of a public airport that is primarily served by aircraft and regularly scheduled flights designed for 60 passengers or less, unless the State aviation agency requests and is granted an exemption by the Federal Aviation Authority (Public Law 106-181 Section 503). This law does not apply to the Lihue Airport because it is not primarily served by flights of 60 passengers or less. This law may apply to the Princeville Airport, but no potential MSWLF sites are located within 6 miles of the Princeville Airport.

3.4.13 Areas within 1,000 Feet of Drinking Water Sources

In order to protect drinking water source supplies, MSWLF are not recommended to be placed within 1,000 ft of a drinking water source. While the locations of drinking water sources used to be publicly available (e.g., during the previous 2001 siting studies), since the events of September 11, 2001, the State of Hawaii Department of Health does not divulge the location of drinking water sources. Therefore, drinking water source exclusion zones have not been mapped.

To satisfy the exclusionary criterion, AECOM met with a Department of Health Safe Drinking Water Branch representative (Jennifer Nikado) on August 24, 2011, to discuss the potential landfill sites and their distances from drinking water sources. After the meeting, AECOM sent GIS files for the potential landfill sites to the Safe Drinking Water Branch representatives, who performed their internal analysis and confirmed that the proposed landfill sites are all more than 1,000 ft from known water sources.

In addition, the County of Kaua'i Department of Water (DOW) reviewed the locations of the potential landfill sites to determine whether there are any current water supply wells or any planned development of well sites in the vicinity of the potential landfill sites. A DOW representative reported that there are no active wells within 1,000 ft of the perimeter of any of the eight potential landfill sites, and with the exception of the Koloa site (reported below in Site-specific Results, Section 3.6), there are no active plans for future water supply wells within the 1,000-foot zone at any of the other sites (Eddy 2011).

3.4.14 Wetland Areas

To protect the sensitive ecology of a wetland, owners are discouraged from locating MSWLFs in a wetland area, unless the criteria in HAR §11-58.1-13(c) are met. There is not a strict prohibition against locating a MSWLF in a wetland, but to do so, several requirements must be met, and mitigation measures would likely be required. Figure 3-10 shows potential wetland areas on the

island of Kauai, according to the U.S. Fish and Wildlife Service's (USFWS) National Wetlands Inventory (NWI).

The NWI was created in response to the Emergency Wetlands Resources Act of 1986, which mandated the USFWS to map the wetlands of the United States. The purpose of the NWI is to support resource management decisions at the federal, state, and local government levels, and promote the conservation and protection of fish and wildlife habitats. As a resource tool, the NWI provides users with the status, extent, characteristics, and functions of wetland, riparian, deepwater, and related aquatic habitats in priority areas. Wetlands are mapped by the NWI through an analysis of high altitude imagery and other data sources, including information provided by public and private entities. The term "wetland" is used to refer to a number of different aquatic habitats. By definition, the FWS classifies a wetland as having at least one of the following attributes: (1) the land at least periodically supports predominant hydrophytes; (2) the substrate is predominantly undrained hydric soil; or (3) the substrate is saturated with water or covered by shallow water at some time during the growing season of each year. Types of wetlands mapped in the NWI include:

- Freshwater emergent – herbaceous marsh, fen, swale, and wet meadow
- Freshwater forested/shrub – forested swamp or wetland shrub bog or wetland
- Freshwater pond – pond
- Lake – lake or reservoir basin
- Riverine – river or stream channel
- Other – farmed wetland, saline seep, and other miscellaneous wetland

If a site contains a feature mapped in the NWI, and the site is chosen for further consideration, the USACE will be consulted to determine whether the feature is a regulated (i.e., "jurisdictional") wetland under Section 404 of the Clean Water Act. Such an evaluation may be completed simply by investigating the feature and its surroundings, or it may require a more detailed wetland delineation. If a feature is determined to be a jurisdictional wetland, further investigations may be required. This would not necessarily preclude using a site as a MSWLF, but may require additional studies and mitigation, which could present additional costs to the County (which are not accounted for at this stage).

The Wetlands Mapper page of the USFWS NWI (<http://www.fws.gov/wetlands/data/Mapper.html>) was accessed on December 21, 2011 to download wetlands data for the island of Kaua'i and produce Figure 3-10. Figure 3-10 is titled *potential* wetland areas, and these areas are depicted separately from the other exclusion zones on Figure 3-11. Many of the potential wetland areas shown are very conservative classifications of areas that might house wetlands. Therefore, if a potential wetland area is mapped on a potential MSWLF site that is chosen for further evaluation, a wetlands survey and consultation with regulatory agencies should be conducted to determine whether the site actually contains a jurisdictional wetland.

Much more area is classified as potential wetlands in the 2011 USFWS NWI database than was indicated in the 2000-era data used in the initial 2001 siting studies (Earth Tech 2001). For example:

- The entire Mana Plain (on which the Kekaha Mauka site is located) is listed in the current USFWS National Wetlands Inventory database as a freshwater emergent wetland. Presently, however, much of the Mana Plain (including the Kekaha Mauka site) is currently under agricultural use, and much of the area probably does not presently contain actual wetlands.
- The riverine wetland features identified in the USFWS National Wetlands Inventory database includes many ditches and swales that may or may not be regulated wetland features. For example, based on site reconnaissance, several of the features mapped on the Ma'alo site

may be classified as man-made ditches, and not as jurisdictional wetlands. If a ditch or swale that is identified as a riverine wetland is located in the selected landfill parcels, then a wetland survey may need to be conducted to verify the presence or absence of jurisdictional wetlands.

Additionally, we note that wetlands may be present in areas not shown on the USFWS National Wetlands Inventory. Such areas, if present, can be identified in the field (see Section 3.6, below).

Figure 3-12 through Figure 3-19 display the total exclusion zones and additional areas mapped as potential wetlands at each of the eight sites under consideration for siting a new MSWLF on Kaua'i.

3.5 SITE RECONNAISSANCE

On December 9, 2011, site reconnaissance was conducted at each of the eight potential sites to visually inspect for any other issues that could preclude or greatly affect the construction of a landfill or RRP.

The results of the site-specific evaluation and the site reconnaissance reports are presented in Table 3-1. Site reconnaissance photographs are presented in Attachment A.

Table 3-1: Summary of Site-specific Evaluation and Site Reconnaissance

Site	Site-Specific Evaluation	Site Reconnaissance (conducted December 9, 2011)
Kalepa (Figure 3-12) (Photos 1-4)	<p>No exclusion zones were mapped on the site.</p> <p>A small riverine feature was mapped through the site (USFWS codes R4SBCx, R3UBH), as shown on Figure 3-12 and Photo 1.</p> <p>If the Kalepa site is chosen for further consideration, it would require a wetlands survey and consultation with regulatory agencies to determine whether any regulated wetlands are present, whether any restoration plans are in place for the affected area, and whether any mitigation would be required for site development.</p>	<p>The site slopes gently to the south. Much of the site has recently been disked (suggesting active use) with edges that are not in use, covered in grasses. A former ditch or roadway appears to form the eastern border. A moveable irrigation system is installed in between one of the fields (operational status unknown). No standing water, unique vegetation, or other salient features were observed.</p> <p>It is possible that a wetland survey, if conducted, might conclude that the mapped potential wetland feature is actually an abandoned ditch, and not a regulated wetland.</p>
Kekaha Mauka (Figure 3-13) (Photos 5-8)	<p>No exclusion zones were mapped on the site.</p> <p>According to the USFWS National Wetlands Inventory database, almost the entire Kekaha Mauka site lies within a potential wetland area, classified as freshwater emergent wetland (USFWS code PEM1Fd). A riverine feature (USFWS code R3UBH) is also present on site.</p> <p>If the Kekaha Mauka site is chosen for further consideration, it would require a wetlands survey and consultation with regulatory agencies to determine whether any regulated wetlands are present, whether any restoration plans are in place for the affected area, and whether any mitigation would be required for site development.</p>	<p>The site is flat across the entire proposed site, a majority of which is a mix of fallow land overgrown with mixed shrub vegetation and recently tilled agricultural land. The section immediately opposite the highway from the existing landfill is in active agricultural production. An active irrigation ditch runs along the southeast border and then cuts across the site. A dry, unlined floodway forms three-fourths of the mauka boundary and then crosses through the site. Surface water is present in a section overgrown with shrubs and low trees (haole koa) parallel to the highway, likely from the adjacent irrigation ditch.</p> <p>Based on site reconnaissance, it is likely that a wetland delineation and regulatory consultation would conclude that the site does not contain a regulated wetland (see discussion of potential wetlands in Section 3.4.14).</p>

Site	Site-Specific Evaluation	Site Reconnaissance (conducted December 9, 2011)
<p>Kipu (Figure 3-14) (Photos 9-12)</p>	<p>No exclusion zones and no potential wetland areas were mapped on the site.</p>	<p>The site is set back from the main highway but has feeder road access. The site is relatively flat fallow agricultural land overgrown with grass. Many of the fields had recent grass growth, possibly regrowth following disking. A substantial drop-off to a large gulch forms part of the southern border of the site. Ironwood trees are more common closer to the gulch, and albezia trees grow in patches of unused land across the site. No natural or agricultural water courses were observed.</p>
<p>Koloa (Figure 3-15) (Photos 13-16)</p>	<p>No exclusion zones and no potential wetland areas were mapped on the site. The County of Kaua'i DOW reports that the water supply wells in the Koloa area are very productive, and the DOW may want to drill new wells or utilize existing wells in this area in the future (Eddy 2011).</p>	<p>The site slopes toward the ocean and is in use for cattle toward the north and fallow closer to the mill facilities. An active ditch forms the southern boundary of the site. Parts of the southern portion of the site are terraced, while the northern portion is more homogeneous. The southern section is overgrown primarily with guinea grass and haole koa, whereas the graze sections have scattered albezia and mixed grass cover.</p>
<p>Kumukumu (Figure 3-16) (Photos 17-28)</p>	<p>No exclusion zones were mapped on the site. According to the USFWS National Wetlands Inventory database, a riverine feature may be present through the center of the site, and mauka of the site border (USFWS code R3UBH). If the Kumukumu site is chosen for further consideration, it would require a wetlands survey and consultation with regulatory agencies to determine whether any regulated wetlands are present, whether any restoration plans are in place for the affected area, and whether any mitigation would be required for site development.</p>	<p>The site is a shallow gulch surrounded by plateau-like former agricultural land that is now grassland, sections of which are in use for cattle. Fencing appears to prevent cattle from entering the gulch. The gulch vegetation is mixed. At the mauka end of the site, no surface water inputs to the gulch were visible, and no water or wetland features were observed in the potential wetland areas mapped west of the site on Figure 3-16. A seep at the northern proposed landfill border contributes surface water across a grassy area south toward the gulch (Figure 3-16 and Photo 23); no vegetation characteristic of wetlands was noted. Small features with standing water (Photos 27 and 28) were observed along a relatively short portion of the riverine feature mapped in the middle of the site on Figure 3-16. Patches of hau and ginger suggest moist soil along other parts of the gulch as well; the vegetation was too thick to observe water in some areas, if present. The Kumukumu site, if chosen, would require a wetland survey near all mapped or observed water features.</p>
<p>Ma'alo (Figure 3-17) (Photos 29-44)</p>	<p>The boundaries of the Ma'alo site were redrawn during this siting study due to leaseholder requests and confirmed wetland features (southwest of the site border shown on Figure 3-17) present within the area identified for this site in the 2001 siting studies (Earth Tech 2001). A number of small riverine features are present within the site borders (USFWS code: R4SBCx), as shown on Figure 3-17. If the Ma'alo site is chosen for further consideration, it would require a wetlands survey and consultation with regulatory agencies to determine whether any regulated wetlands are present, whether any restoration plans are in place for the affected area, and whether any mitigation would be required for site development.</p>	<p>The site is largely former sugarcane land that is in use for cattle ranching, and slopes gently to the south and west. An active ditch (trampled by cattle) intersects the middle of the northernmost extent of the site. While primary flow makes a 90-degree right turn (to the west; Photo 41) at the proposed northern border, water continues straight into the site, filling an abandoned ditch approximately one-fifth of the way into the site (Photo 32). There was no obvious sign of flow along this one extension into the site, and no vegetation characteristic of wetlands was noted. This ditch from the north also forms the proposed northwest border of the site (Photos 30 & 31). Standing water, artificially fed by irrigation piping, was observed on or near the site's west boundary, (Photo 29). Another area with a small amount of surface water was observed midway along the eastern border just inside the proposed project boundary (Photo 35). The vegetation at the edge of the wet area matches that of the surrounding grasslands. The Ma'alo site, if chosen, would require a wetland survey near all mapped or observed water features.</p>

Site	Site-Specific Evaluation	Site Reconnaissance (conducted December 9, 2011)
Pu'u O Papai (Figure 3-18) (Photos 45-48)	No exclusion zones and no potential wetland areas were mapped on the site.	The site slopes gently toward a small gulch to the north and is a mix of active and fallow agricultural land. The site is set back from the highway; and access presently is via a dirt haul road. No water courses or undisturbed areas exist at the site. A large plantation-era home and associated buildings are located a few hundred feet to the south (uphill) of the site. A reservoir for irrigation is located to the southeast (uphill) (Photo 45).
Umi (Figure 3-19) (Photos 49-52)	No exclusion zones and no potential wetland areas were mapped on the site.	The site slopes toward the ocean and is in active coffee production. Most of the patchiness of the site visible in aerial photos is piles of basalt stones that presumably may be the result of preparing the fields for agricultural use. Active, maintained ditches run across the mauka and makai boundaries of the proposed landfill site. A small gulch runs parallel to the eastern boundary. A gravel stockpile is located at the east border of the proposed RRP site.

3.6 SLCE CONCLUSION

All eight sites remain potential landfill sites, and no site was mapped in any of the exclusion zones.

The DOW indicated that it may wish to advance more water supply wells on or near the Koloa site at some point in the future.

Should the Kalepa, Kekaha Mauka, Kumukumu, or the Ma'alo site be selected for siting the new MSWLF, additional investigation and agency consultation would be required to determine whether wetlands are on site, and, if so, what mitigation measures may be appropriate.

No other potentially problematic issues were identified for any site in this SLCE.

Path: P:\ENV\Non-Federal\County of Kauai\New Landfill\09_GIS\02_Maps\01_State_LF_Criteria\Figure_3_3.mxd

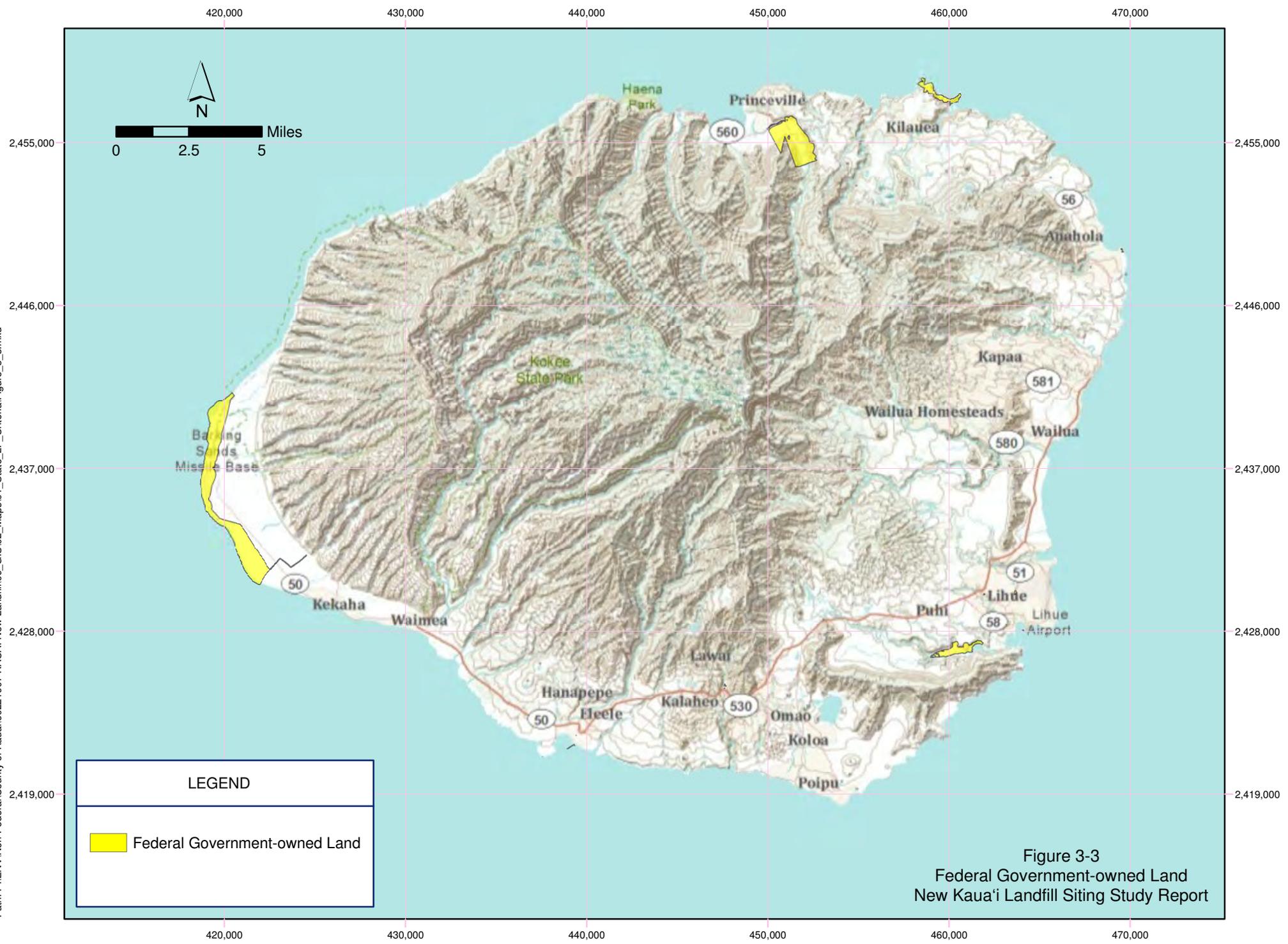
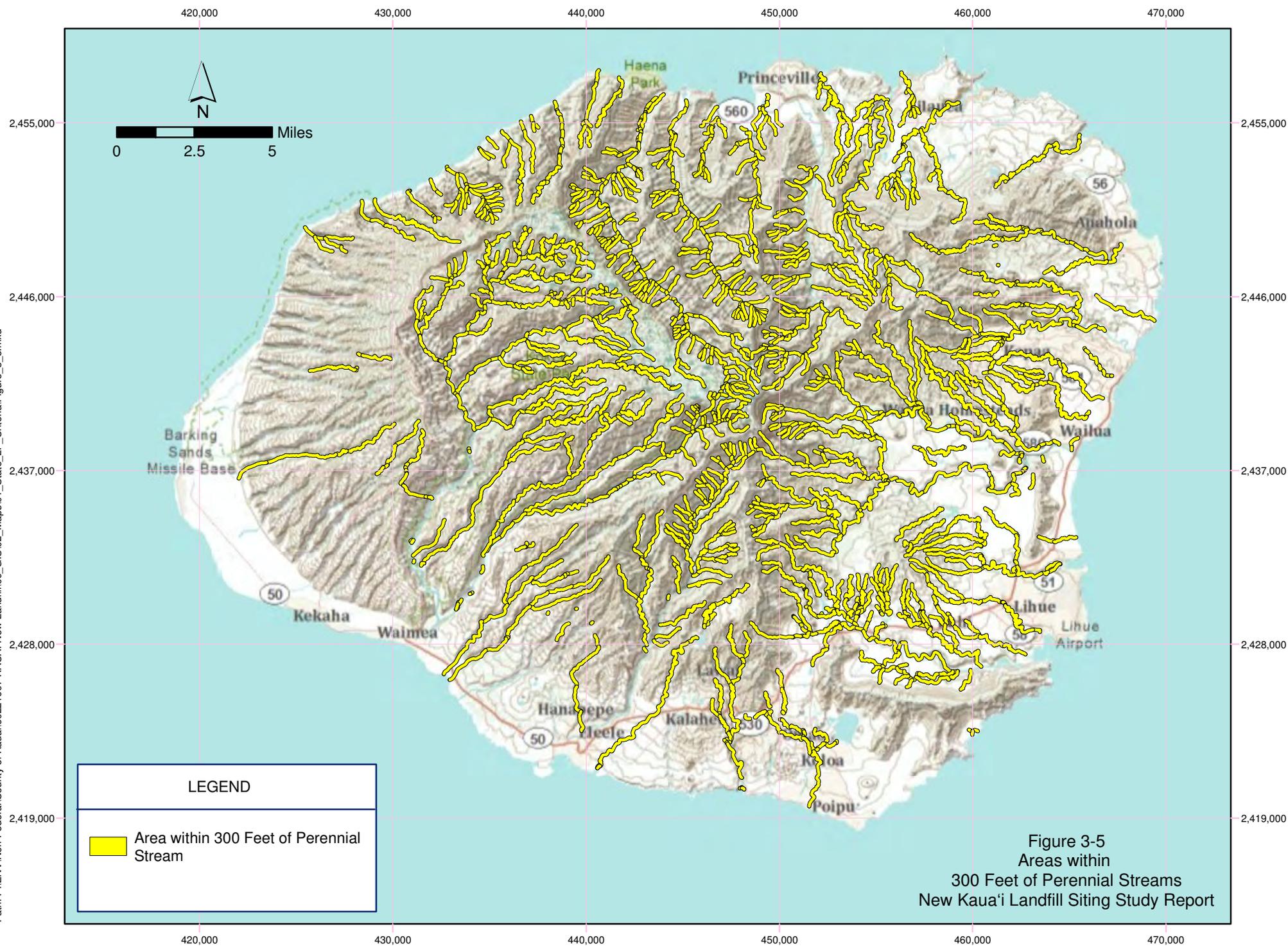


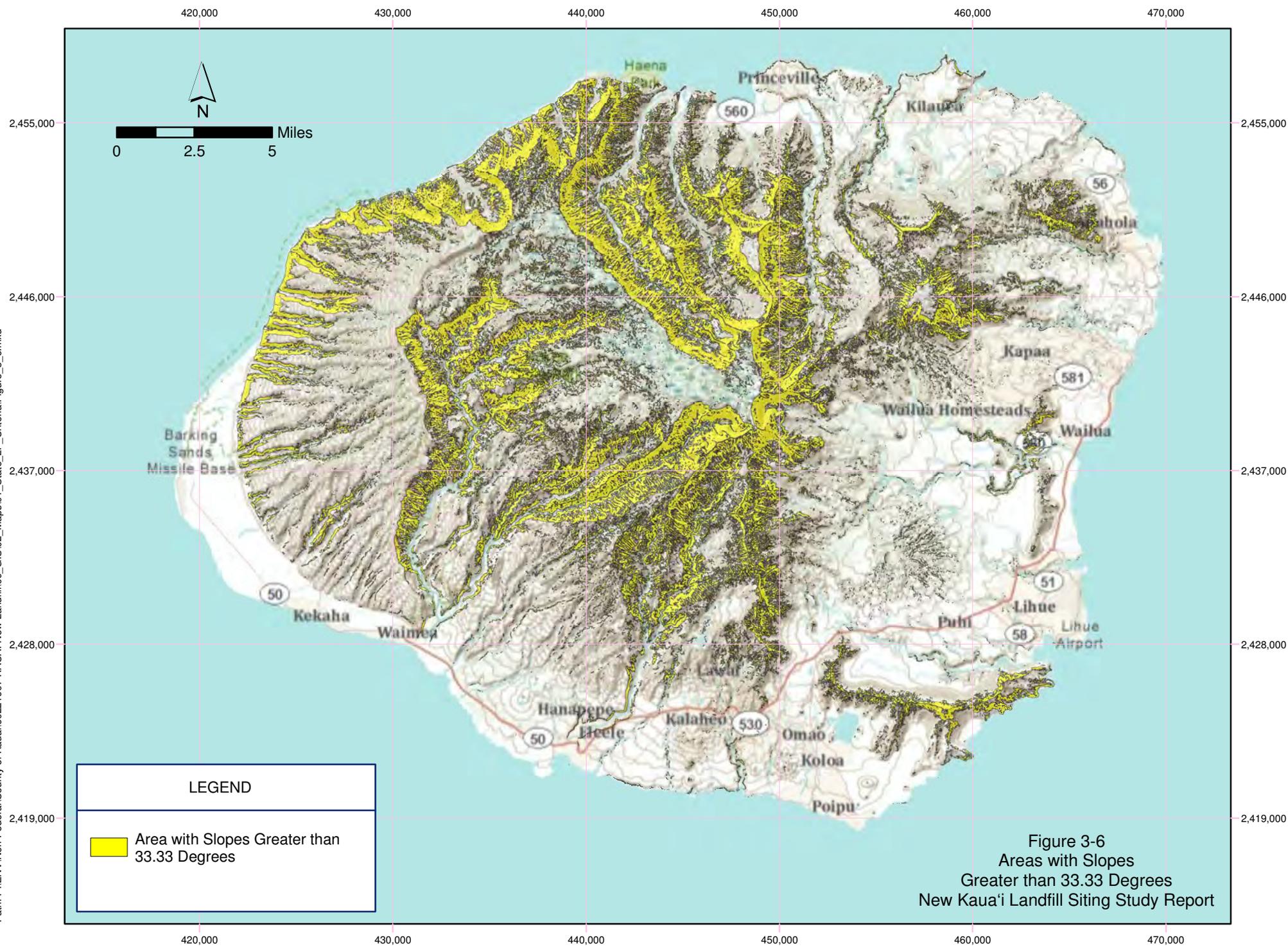
Figure 3-3
Federal Government-owned Land
New Kauai Landfill Siting Study Report



LEGEND	
	Area within 300 Feet of Perennial Stream

Figure 3-5
Areas within
300 Feet of Perennial Streams
New Kauai Landfill Siting Study Report

Path: P:\ENV\Non-Federal\County of Kauai\60221907 KAUAI-New Landfill\09_GIS\02_Maps\01_State_LF_Criteria\Figure_3_6.mxd



LEGEND

 Area with Slopes Greater than 33.33 Degrees

Figure 3-6
Areas with Slopes
Greater than 33.33 Degrees
New Kauai Landfill Siting Study Report

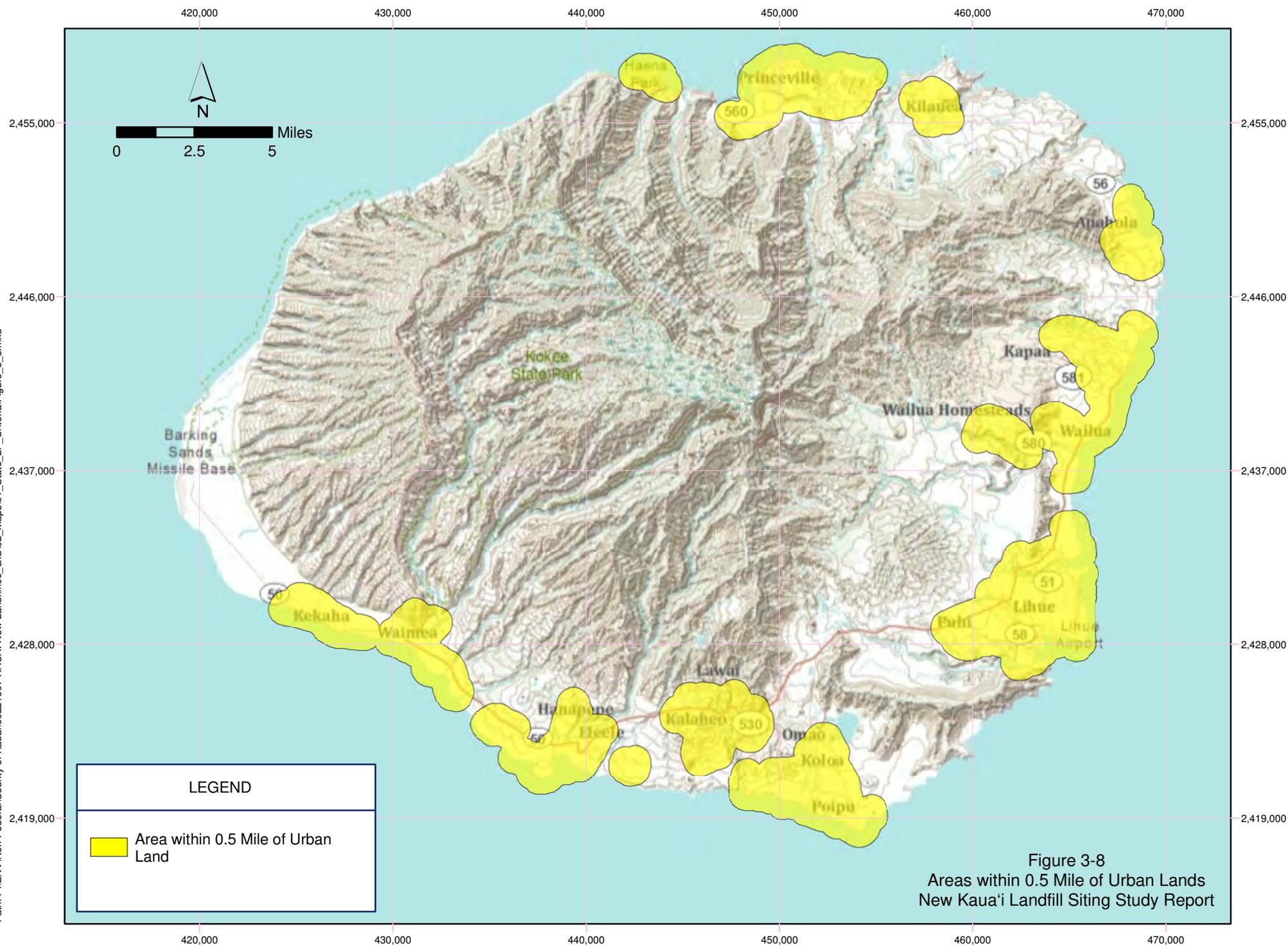


Figure 3-8
Areas within 0.5 Mile of Urban Lands
New Kauai Landfill Siting Study Report

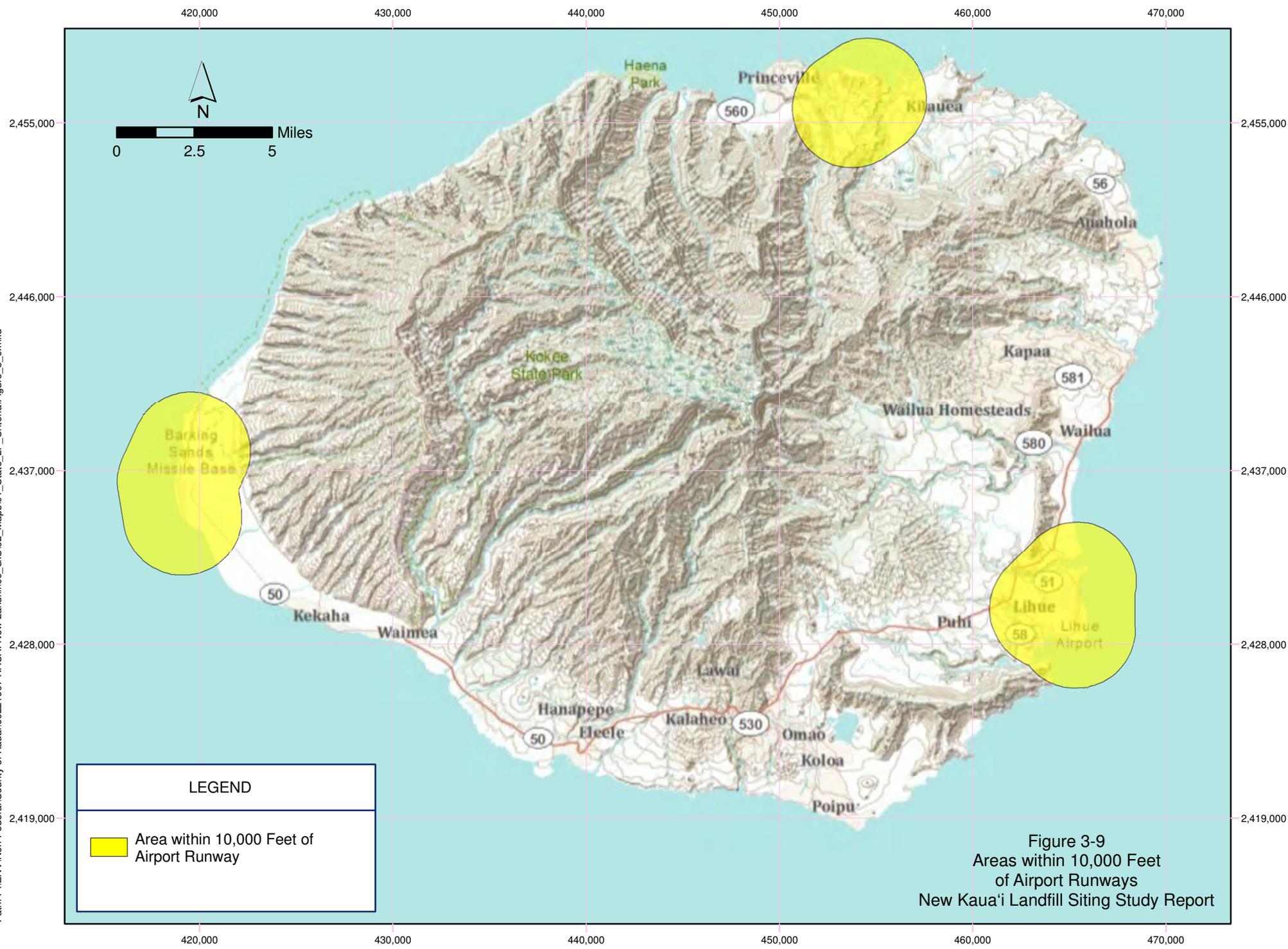


Figure 3-9
Areas within 10,000 Feet
of Airport Runways
New Kauai Landfill Siting Study Report

Path: P:\ENV\Non-Federal\County of Kauai\60221907 KAUAI-New Landfill09_GIS\02_Maps\01_State_LF_Criteria\Figure_3_10.mxd

