3.14 TERRESTRIAL/COASTAL BIOLOGICAL RESOURCES

This section identifies terrestrial and coastal biological resources within and adjacent to the landing site areas (see Figure 2-1). The section also identifies the potential impacts and conservation and construction measures (CCMs) for implementation of an undersea power cable system.

3.14.1 Resource Definition

This section defines the terrestrial and coastal resources that have been analyzed as part of the proposed implementation of an undersea power cable system. The resources identified below occur in one or more of the landing site areas. For an identification of which resources occur in each of the landing site areas, and a description of the ecology of each landing site area, refer to Section 3.14.4.

Terrestrial Resources

Habitats

Terrestrial habitats include a variety of grasslands, forests, scrublands, and urban habitats. Most terrestrial habitats often do not receive regulatory protection (as compared to wetlands). However, groupings of numerous contiguous habitats that occur in state parks, refuges etc., are afforded regulatory protection from development. These large contiguous habitats (e.g., state parks) are identified through available resource mapping.

To classify the terrestrial habitats in the landing site areas, the habitat coverage for the landing site areas were identified per the USGS's Hawai'i Gap Analysis Program (HI-GAP). The HI-GAP statewide land cover layer was developed as an input for the production of avian habitat range maps and to identify "gaps" within current biodiversity conservation efforts, as required by the National Gap Analysis Program. The habitat coverage contained within the HI-GAP dataset is also suitable for conducting bio-geographic analysis such as those contained herein. The HI-GAP land cover dataset covers all eight main Hawaiian Islands. Land cover for each of the islands was produced from automated classifications of Landsat ETM+ imagery from 1999–2004. The Landsat data were further edited using ancillary data to better improve class distributions. Classes are broken down into both island- and state-based datasets. There are 71 island-based and 37 state-based classes in total. For purposes of this analysis, the more detailed island-based cover type classifications have been used. Table 3.14-1 identifies the mapped habitats within the landing site area per the GAP analysis data.

Wildlife that would be expected to occur in the habitats identified in Table 3.14-1 would vary considerably. Developed habitats and sparsely vegetated habitats (e.g., high-density developed, etc.) are often considered habitats of low ecological value. Habitats of higher ecological value

are undeveloped habitats (forests, shrublands, etc.) as they typically support larger and diverse wildlife assemblages due to the increased vegetative cover, vegetation diversity, and less anthropogenic perturbations. Large areas of habitat complexes (i.e., undeveloped habitats and contiguous habitats) provide the most value to wildlife. Undeveloped habitats that are completely surrounded by developed habitats do provide some ecological value, although this value is limited due to habitat isolation.

Developed habitats would be utilized by animal species adapted to an urban environment. Many of the urban bird species commonly observed in developed habitats include doves (Order Columbiformes), bulbuls (*Pycnonotus* sp.), and northern cardinal (*Cardinalis cardinalis*). Escaped exotic birds including rose-ringed parakeet (*Psittacula krameri*), red-crowned parrot (*Amazona viridigenalis*) and red-masked parakeet (*Aratinga erythrogenys*) are also often seen in urbanized areas. Except for bats, Hawaiʻi has no native mammals. Mammal species common to urban environments would include small rodents and feral cats and dogs.

Typical wildlife associated with these habitats includes larger mammals (e.g., feral pigs [*Sus scrofa*], Indian mongoose (*Herpestes javanicus*), and Axis deer (*Axis axis*), *etc.*). Feral pigs are found on Maui, Molokaʻi, and Oʻahu but have not been documented on Lānaʻi. The Indian mongoose is found on Maui, Molokaʻi, and Oʻahu but has not been documented on Kauai. Most mongoose are found below the elevation of 3,000 ft but can range up to 8,000 ft and live in rock crevices. Axis deer are established on Molokaʻi, Lānaʻi, and Maui. Goats (*Capra hircus*) can be found on all the main Hawaiian Islands except Lānaʻi and are often observed along ravines and in arid areas. No native forest birds are expected in the landing site areas. Hawaiʻi's native forest birds occupy native forests at high elevations.

Wetlands

Wetlands are identified based on available federal and state mapping. Wetland data were obtained through the U.S. Fish and Wildlife Service (USFWS) National Wetlands Inventory (NWI) database, where geographically referenced files were download and added into GIS software for both mapping and analysis purposes. When appropriate, the wetland maps were supplemented with additional wetland resources based upon available documentation.

Inland Surface Waters

Inland surface waters are nonsaline water bodies (e.g., freshwater ponds, streams, etc.). The State of Hawaiʻi segregates inland waters into three classifications[9] based on their water quality:

- Class 1: [are to] remain in their natural state as nearly as possible with an absolute minimum of pollution from any human-caused source. To the extent possible, the wilderness character of these areas would be protected. Waste discharged into these

[9] Section 11-54-05.1, HAR.

waters is prohibited. Any conduct which results in a demonstrable increase in levels of point or nonpoint source contamination in class 1 waters is prohibited.

- Class 1(a): classification is for waters of scientific and educational uses, protection of breeding stock compatible recreation, aesthetic enjoyment, and other nondegrading uses.
- Class 1(b): classification is for domestic water supplies and uses identified for Class 1(a).
- Class 2: Class 2 waters are to be protected] for recreational purposes, agricultural and industrial water supplies.

In addition to freshwater bodies, the State of Hawai‘i also classifies wetlands and riparian areas adjacent to the water bodies (HDOH 2012).

Fauna in inland surface water vary considerably between flowing systems (streams) and confined systems (lakes, ponds, and reservoirs). Nonflowing systems have been stocked with many species common to the U.S. mainland. However, Hawai‘i’s streams are home to a limited number of species that are highly adapted.

There are five species of native stream fish. Four of these are endemic and one is indigenous to Hawai‘i and other Pacific islands (DNR 2012). The fish are amphidromous and have special adaptations to climb up streams and rocky bottoms for spawning. Alteration of stream beds, increased sedimentation, and nutrient loading has led to the decline of fish species in some streams. Native stream shellfish, all of which are endemic, consists of two crustaceans and three mollusks.

Coastal Resources

<u>Coral Reefs and Other Benthic Habitats</u>

Benthic habitats are those habitats that occupy the marine substrate. In Hawaiian waters, coral and coral reefs often strongly influence the composition and structure of benthic habitats that occur in depths of less than 100 ft. Deep water habitats, those deeper than 300 ft, are often devoid of reef-building coral species. Between the depths of 100 and 300 ft, the amount of coral cover can be highly variable based on site conditions.

The mapping of benthic habitats within the landing site areas was largely based on the *Shallow-Water Benthic Habitats of the Main Eight Hawaiian Islands – 2007* (Batista et al. 2007). NOAA and the National Ocean Service (NOS) initiated a coral reef research program in 1999 to map, assess, inventory, and monitor U.S. coral reef ecosystems (Monaco et al. 2001). Twenty-seven distinct benthic habitat types within 11 zones were mapped in a GIS using visual interpretation of orthorectified aerial photographs and hyperspectral imagery. A description of the zones (i.e.,

unconsolidated sediment, coral reef and hard bottom, coral reef and colonized hardbottom, uncolonized hard bottom, and encrusting/coralline algae) and their associated cover types that occur within the landing site areas are described below. When appropriate, the benthic habitat maps were supplemented with additional resources based upon available documentation.

- Unconsolidated sediment with less than 10 percent cover of submerged vegetation. This zone has two mapped cover types (Mud and Sand) that occur in the landing site areas.
    - Mud: Fine sediment often associated with river discharge and buildup of organic material in areas sheltered from high-energy waves and currents.
    - Sand: Coarse sediment typically found in areas exposed to currents or wave energy.
- Coral Reef and Hardbottom: Hardened substrate of unspecified relief formed by the deposition of calcium carbonate by reef-building corals and other organisms (relict or ongoing) or existing as exposed bedrock or volcanic rock.
    - Spur and Groove: Habitat having alternating sand and coral formations that are oriented perpendicular to the shore or bank/shelf escarpment. The coral formations (spurs) of this feature typically have a high vertical relief relative to pavement with sand channels (see below) and are separated from each other by approximately 3 to 15 ft of sand or bare hardbottom (grooves), although the height and width of these elements may vary considerably. This habitat type typically occurs in the fore reef or bank/shelf escarpment zone.
    - Patch Reef(s): Coral formations that are isolated from other coral reef formations by sand, seagrass, or other habitats and that have no organized structural axis relative to the contours of the shore or shelf edge.
    - Individual Patch Reef: Distinctive single patch reefs.
    - Aggregate Patch Reefs: Clustered patch reefs that individually are too small or are too close together to map separately.
    - Scattered Coral/Rock in Unconsolidated Sediment: Primarily sand or seagrass bottom with scattered rocks or small, isolated coral heads that are too small to be delineated individually (i.e., smaller than individual patch reef).
    - Colonized Pavement with Sand Channels: Habitat having alternating sand and colonized pavement formations that are oriented perpendicular to the shore or bank/shelf escarpment. The sand channels of this feature have low vertical relief relative to spur and groove formations. This habitat type occurs in areas exposed to moderate wave surge, such as the bank/shelf zone.
- Coral Reef and Colonized Hardbottom: Substrates formed by the deposition of calcium carbonate by reef-building corals and other organisms. Habitats within this category have some colonization by live coral, unlike the uncolonized hard bottom category.

- Uncolonized Hardbottom: Hard substrate composed of relict deposits of calcium carbonate or exposed volcanic rock.
    - Reef Rubble: Dead, unstable coral rubble often colonized with filamentous or other macroalgae. This habitat often occurs landward of well-developed reef formations in the reef crest or back reef zone.
- Encrusting/Coralline Algae: An area with 10 percent or greater coverage of any combination of numerous species of encrusting or coralline algae. May occur in shallow back reef, relatively shallow waters on the bank/shelf zone, and at depth.

Fauna of Shallow Coastal Waters

The coastal shallow water ecosystems described above support an extensive network of plant and animal species. Many species of reef fishes, particularly their shelter-associated juvenile stages, are dependent on coral habitats (DeMartini et al. 2010). Estuaries in Hawaiʻi are locally important because they provide juvenile nursery habitat for fish that inhabit marine environments as adults (HFHP 2010). As many as 30 marine fish species occupy these stream-mouth estuaries opportunistically as juveniles before moving to nearshore marine and coral reef habitat (HFHP 2010). Many of the fish species that use estuarine habitat when young are recreationally or commercially important at larger sizes (HFHP 2010). Examples include jacks (Carangidae), mullet (Mugilidae), flagtails (Kuhliidae), and others (HFHP 2010).

Complex habitats will harbor higher biomass and greater species richness (Friedlander et al. 2010). Shallow nearshore habitats are necessary for recruit settlement and juvenile survival, while deeper habitats are important foraging, sheltering, and spawning sites for large adults (Friedlander et al. 2010).

Close to shore in shallow water, reefs are characterized by a low cover intermixed with algal-covered boulders. Other reef organisms include species of algae (limu); mollusks and sea urchins; soft corals; and shellfish including lobsters, shrimps, and crabs. At 6–12 ft in depth is the reef bench zone, a wave-swept area dominated by a higher cover coral, mostly lobe coral, which builds massive wave-resistant colonies. In this habitat, the highest diversity of corals is found including lobe coral, cauliflower coral, rice corals, and at least five other common coral species (Tissot undated). In addition, this area is a good habitat for a wide variety of seaweeds, other invertebrates, shore fishes, and lobsters (Tissot undated).

Around coral reefs, fishes are abundant and diverse, and are dominated primarily by parrotfish or *uhu* and surgeonfishes, such as convict tangs or *manini* (*Acanthurus triostagus*), brown surgeonfish (*A. nigrofuscus*), orange-band surgeonfish or *naʻenaʻe* (*A. olivaceus*), goldring surgeonfish or *kole* (*Ctenochaetus stigosus*), and yellow tangs or *lauʻipala* (*Zebrasoma flavescens*) (Tissot undated). Other common nearshore fishes are moray eels or *puhi* (mostly *Gymnothorax meleagris* and *G. flavomarginatus*), and several types of wrasses, triggerfish,

puffers, and butterflyfishes (Tissot undated). Green sea turtles or *honu* (*Chelonia mydas*) are also commonly seen (Tissot undated).

The breakdown of the skeletons of reef organisms to sand-size particles continually offers replenishment to white sand beaches along Hawaiian coasts (Maragos 1975). Shallow coral reefs also act as natural breakwaters in protecting coastal lands or lagoon waters from large waves and storms.

Benthic Habitats and Fauna – Below 100 ft

A 2006 study of the coastline of the island of Hawaiʻi identified that, at this location, coral colonization is most prevalent at depths up to 60 ft. However, at a depth of approximately 80 ft coral coverage lessens dramatically. Below 90 ft, the benthic substrate is practically uncolonized (USGS 2006).

Deeper water coastal habitats (depths greater than 100 ft) have no available similar mapping as compared to the shallow water habitats. In general, deep water habitats are more homogenous than shallow water habitats due to the attenuation and/or absence of sunlight. Several available reports that studied habitats greater than 100 ft within Hawaiian coastlines were reviewed.

Another study of the seafloor conducted, near the Honolulu Airport, in water depths up to 300 ft identified that corals were rare at depths in excess of 120 ft and small in size (Brewer 2001). In depths from 170 and 260 ft, benthic fauna include an unidentified tube-dwelling, mound-building, nocturnal terebellid (family Terebellidae) polychaete worm. Irregular to sometimes linear tracks were occasionally observed on the substrate at water depths between 170 and 260 ft. These tracks may result from gastropod (snail) foraging or the movement or grazing activities of other benthic invertebrates (Brewer 2001).

<u>Marine Waters – Open water Column</u>

Open water habitats are considered all waters that are above the benthic substrate and below the high tide line. For purposes of water quality classification, in the State of Hawaiʻi marine waters are separated by type into three categories: embayment, open coastal, and oceanic (HDOH 2012)

- Embayments are defined as land confined and physically protected marine waters with restricted openings to open coastal waters, defined by the ratio of total bay volume to the cross-sectional entrance area of 700 to 1 or greater.
- Open coastal waters extend from the shoreline to the 100-fm (600-ft) depth contour.
- Oceanic waters occur beyond the 100-fm contour.

In the State of Hawai‘i, the classification for marine waters uses a tiered system, defining two Classes, “AA” and “A.”

- Class AA waters: “It is the objective of class AA waters that these waters remain in their natural pristine state as nearly as possible with an absolute minimum of pollution or alteration of water quality from any human-caused source or actions. To the extent practicable, the wilderness character of these areas shall be protected.” Zones of mixing are not permitted within certain Class AA waters (HAR Title 11 Chapter 54-3(c)(1)).
- Class A waters: “It is the objective of class A waters that their use for recreational purposes and aesthetic enjoyment be permitted as long as it is compatible with the protection and propagation of fish, shellfish, and wildlife, and with recreation in and on these waters.” New sewage discharges or industrial discharges are not permitted within Class A embayments, with the exception of three industrial discharge types identified in HAR Title 11 Chapter 54-3(c)(2).

Essential Fish Habitat

According to the Magnuson-Stevens Fishery Management and Conservation Act (MSA), Essential Fish Habitat (EFH) is defined as “those waters and substrate necessary to fish for spawning, breeding or growth to maturity.” In 1999, NMFS issued guidelines intended to assist the Fishery Management Councils in implementing the EFH provision of the MSA, and set forth the following four tasks:

1. Identify and describe EFH for all species managed under a fisheries management plan (FMP).
2. Describe adverse impacts to EFH from fishing activities.
3. Describe adverse impacts to EFH from nonfishing activities.
4. Recommend conservation and enhancement measures to minimize and mitigate the adverse impacts to EFH resulting from fishing and non–fishing related activities.

Because EFH has to be identified for each major life history stage, information about a species’ distribution, density, growth, mortality, and production within all of the habitats it occupies, or formerly occupied, is also necessary (WPRFMC 2009).

The Western Pacific Regional Fishery Management Council (the Council) developed a Fishery Ecosystem Plan (FEP) as an FMP, consistent with the MSA and the national standards for fishery conservation and management (WPRFMC 2009). The Hawai‘i Archipelago FEP establishes the framework under which the Council will manage fishery resources, and begin the integration and implementation of ecosystem approaches to management in the Hawai‘i Archipelago (WPRFMC 2009). This FEP does not establish any new fishery management

regulations, but rather consolidates existing fishery regulations for demersal species (WPRFMC 2009). Specifically, the FEP identifies as management unit species (MUS) those species known to be present in waters around the Hawai‘i Archipelago and incorporates all of the management provisions for FMPs for bottomfish and seamount groundfish, crustaceans, precious corals, and coral reef ecosystems (WPRFMC 2009). Descriptions of these resources are provided below. Although pelagic fishery resources play an important role in the biological as well as the socioeconomic environment of these islands, they are managed separately through the Pacific Pelagic FEP (WPRFMC 2009).

Bottomfish. Based on known distributions and habitat requirements of adult bottomfish, the Council designated all escarpments/slopes between approximately 120–855 ft throughout the Western Pacific Region, including the Hawai‘i Archipelago, as bottomfish Habitat Area of Particular Concern[10] (HAPC) (WPRFMC 2009). In addition, the Council designated the three known areas of juvenile opakapaka habitat (two off O‘ahu and one off Moloka‘i) as HAPC (WPRFMC 2009). Off O‘ahu, juvenile snappers occupy a flat, open bottom of primarily soft substrate in depths ranging from 122 to 223 ft (WPRFMC 2009).

Crustaceans. Research indicates that banks with summits shallower than 92 ft support successful recruitment of juvenile spiny lobster while those with a summit deeper than 92 ft do not (WPRFMC 2009). For this reason, the Council has designated all banks in the NWHI with summits less than 92 ft as HAPC (WPRFMC 2009).

Precious Corals. The Council designated three of the six known precious coral beds—Makapuu, Wespac, and Brooks Bank—as HAPC (WPRFMC 2009). Makapuu bed was designated as HAPC because of the ecological function it provides, the rarity of the habitat type, and its sensitivity to human-induced environmental degradation (WPRFMC 2009). For black corals, the Council designated the Auau Channel as HAPC because of the ecological function it provides, the rarity of the habitat type, and its sensitivity to human-induced environmental degradation (WPRFMC 2009). Its commercial importance was also considered (WPRFMC 2009).

Coral Reef Ecosystems. EFH for coral reefs and associated habitats that are utilized by various life stages of coral reef fish are designated to depths of 50 fm and to the limit of the EEZ (WPRFMC 2009). Coral reefs also receive regulatory protection under EO 13989.

Threatened and Endangered Species

Threatened and endangered species are identified based on available federal and state regulatory data. Critical habitats are defined in the ESA as those areas of habitat that are known

[10] Habitat Areas of Particular Concern (HAPCs) are described in the rules as subsets of EFH that are rare, particularly susceptible to human-induced degradation, especially ecologically important, or located in an environmentally stressed area. HAPCs are not afforded any additional regulatory protection under the Magnuson-Stevens Act; however, federal actions with potential adverse impacts to HAPC will be more carefully scrutinized during the consultation process and will be subject to more stringent EFH conservation recommendations.

to be essential for an endangered or threatened species to recover, and that require special management or protection. Geographically referenced areas of critical habitats were obtained and analyzed using GIS software to determine the presence of these areas within the landing site areas. GIS data used for purposes of this analysis include critical habitats from USFWS (USFWS Pacific Islands Office 2004) and bird habitat ranges from the DLNR Division of Forestry and Wildlife (DOFAW) (no date referenced). When appropriate, the threatened and endangered species maps were supplemented with additional resources based on available documentation.

Based on supporting documentation, Table 3.14-2 identifies the listed species that are known to occur or probably occur within one or more of the landing site areas. However, due to the remoteness of some of the landing site areas and/or the lack of available data, it is possible that other federal and state listed species occur within the landing site areas. Following Table 3.14-2 is a description of each species identified in the table. The potential for the species to occur in each landing site area is discussed in detail in Section 3.14.3.

Terrestrial

Descriptions of the terrestrial threatened and endangered species identified in Table 3.14-2 follows.

Birds

Hawaiian duck (federal endangered), also known as Koloa, inhabits lowland wetlands, river valleys, and mountain streams. This species typically travels in pairs and feeds on mollusks, insects, and freshwater vegetation. The main breeding season occurs from January through May. The Hawaiian duck historically used a wide variety of natural wetland habitats for nesting and feeding, including freshwater marshes, flooded grasslands, coastal ponds, streams, montane pools, and forest swamplands at elevations ranging from sea level to 9,900 ft. Agricultural and artificial wetlands such as taro, lotus (*Nelumbo nucifera*), shrimp, fish, and sewage treatment ponds supplement natural wetland habitats and are also utilized as feeding habitat by the Hawaiian duck. They may also use irrigation ditches, flooded ephemeral fields, reservoirs, and the mouths of larger streams for feeding or nesting. Wetlands that are relatively small, isolated, or close to houses are less likely to be occupied (Uyehara et al. 2008).

Hawaiian coot, also known as ‘Alae ke‘oke‘o, occurs in coastal plain lowland wetlands ranging from sea level to 850 ft, rarely to 3,500 ft, preferring lowland wetland habitats with suitable emergent plant growth interspersed with open water (Brisbin et al. 2002). However, some birds have been observed in mountain streams and stock ponds at higher elevations (Perkins 1903) on Hawai‘i. Hawaiian coots prefer freshwater wetlands but will use brackish wetlands and, rarely, saline habitats. Hawaiian coots forage in water less than 12 inches deep but can dive in water up to 48 inches deep. This species feeds on seeds and leaves of aquatic plants, insects,

invertebrates (snails, crustaceans), tadpoles, and small fish. The primary breeding season is from December through March. During the breeding season, this species prefers deeper water interspersed in emergent vegetation, which is used to construct nests and provides shelter for young birds. This species rarely flies but is capable of sustained flight close to water.

Hawaiian common moorhen can be found in freshwater marshes, taro patches, irrigation ditches, reservoirs, and wet pastures. This species favors dense emergent vegetation near open water, floating or barely emergent mats of vegetation, and water depths of less than 3 ft. This species prefers freshwater as opposed to saline or brackish water.

Hawaiian stilts are found on all the main Hawaiian Islands, except Lānaʻi. Foraging habitat consists of ephemeral fresh, brackish, or saltwater habitats. Water depth and vegetation density are important determinants of the suitability of foraging habitat. Hawaiian stilts appear to select sites with little or even no cover surrounding the nest (Coleman 1981), presumably so their ability to spot predators is not affected (Morin 1998). This species prefers sites with a water depth of less than 9 inches, limited and low growing vegetation, or exposed tidal flats. Preferred nesting habitats are sites adjacent to or low-relief islands in bodies of fresh, brackish, or saltwater. Nesting occurs from March through August and peaks in May and June.

Newell's shearwater is found on open tropical seas and offshore waters near breeding grounds. During their April through November breeding season, the species nest in burrows under ferns on forested mountain slopes. These burrows are used year after year and usually by the same pair of birds.

Hawaiian short-eared owl can be found in a variety of habitats, including wet and dry forests, but are most common in open habitats such as grasslands, shrublands, and montane parklands, including urban areas and areas actively managed for conservation.

Mammal

Hoary bat is the most widely distributed bat in North America. In Hawaiʻi, ʻōpeʻapeʻa has been reported from all the main Hawaiian Islands except for Niʻihau, although specimen records only exist for Kauaʻi, Oʻahu, Maui, Molokaʻi, and the island of Hawaiʻi; currently, the species may be extirpated from Oʻahu, and Molokaʻi. Evidence of breeding populations (e.g., pregnant or lactating individuals) is limited to Kauaʻi and the island of Hawaiʻi. ʻŌpeʻapeʻa occur in a wide range of habitats across a wide elevation gradient. On the island of Hawaiʻi, bats are found primarily from sea level to 7,500 ft, although they have been observed near the island's summits above 13,000 ft.

Insect

Blackburn's sphinx moth is primarily found in coastal, lowlands, and dry forests in areas that receive less than 50 inches of rainfall throughout the year. Larvae of Blackburn's sphinx moth feed on plants in the nightshade family (*Solanaceae*) and trees within the genus *Nothocestrum* (aiea) on which the larvae consume leaves, stems, flowers, and buds.

Plants

Round-leaved chaff-flower or "Ewa hinahina," is a shrub that ranges in height from 1.5 to 6.5 ft. This species is found at low elevations open, dry forest and open thickets; on talus rocky slopes; and on coralline plains.

Puʻukaʻa is a perennial grass-like plant usually found in wet sites (mud flats, wet clay soil, or wet cliff seeps) on coastal cliffs or talus slopes between 3 and 160 m (10 and 525 ft) in elevation.

Oʻahu rollandia (*Cyanea humboldtiana*) is found on the small islands off to the northeast and east of the landing site area. This species is usually found in wet shrubland from 1,800 to 3,150 ft (549 to 960 m) in elevation. Associated native plants include ferns, alani, ʻuki, kawaʻu, and naupaka kuahiwi.

Native white hibiscus is a shrub or small tree generally 15 to 20 ft in height though a few individuals will grow to 30 ft tall. *Hibiscus arnottianus* is a Hawaiian endemic plant with one endangered subspecies. It is native to the moist to wet forests of the mountains of Molokaʻi and Oʻahu (U of H 2012a).

Native yellow hibiscus can sometimes become a small tree growing up to 30 ft tall. In the garden, it is most often a shrub 3 to 15 feet tall with a diameter of 8 to 15 ft. *Hibiscus brackenridgei* is an endangered Hawaiian endemic plant and it is the official state flower of Hawaiʻi. It is native to dry forests and shrub lands at elevations from 400 to 2,600 ft. It is found on all the main Hawaiian Islands except Niʻihau and Kahoʻolawe (U of H 2012b).

ʻOhai is usually a low, spreading shrub with horizontal or arching branches; it is can also have a treelike habit up to 15 ft tall. It used to grow in dry areas at elevations below 2,500 ft on all of the main islands. However, destruction of these habitats has greatly diminished the natural occurrence of this species within its former range (U of H 2012d).

Koʻoloaʻula is an endemic shrub that grows in dry forests on the islands of Lānaʻi, Maui, Oʻahu, and Hawaiʻi (U.S. Botanic Garden no date). Currently, only about 500 plants remain in fewer than 10 naturally occurring populations throughout the islands (U.S. Botanic Garden no date). The rarity of this plant can be attributed to the alteration of its habitat for agricultural and urban development, overgrazing by livestock and feral animals, and competition from invasive weeds

(U.S. Botanic Garden no date). A conservation plan is currently being implemented by federal and state agencies to protect remaining habitat, establish new populations, and conserve genetic material in seed banks and botanical gardens (U.S. Botanic Garden no date).

Loulu palm is a single-trunked tree with fan-shaped leaves. The Hawaiian *Pritchardia* are generally medium- to large-sized palms growing from 25 to 60 ft tall. The natural habitats of the species vary considerably. *Pritchardia martii* grows in the Koʻolau Mountains of Oʻahu in wet forests at elevations of 1,100 to 2,000 ft. *Pritchardia hillebrandii* is from the windward coast of Molokaʻi and grows in moist to wet forests at elevations of 100 to 1,900 ft (U of H 2012c).

Hawaiʻi's Statewide Aquatic Wildlife Conservation Strategy (SAWCS) presents information on the Hawaiʻi's Species of Greatest Conservation Need (SGCN). There are approximately 276 SGCN species. Due to the similarity of threats and needed actions and lack of information on many species, the species were divided into manageable groupings in the following major categories: freshwater fishes, freshwater invertebrates, anchialine pond fauna, marine mammals, marine reptiles, marine fishes, and marine invertebrates.

Based on available data, the following three listed species may occur in one or more of the landing site areas.

Caper is a perennial shrub that is found in scattered locations on coral, basalt, or rocky soil along the coast or slightly inland. It inhabits coastal low shrublands and rocky shores at elevations from sea level to 325 ft on all of the main Hawaiian Islands.

Dwarf naupaka occurs in Kahului Harbor and northwest along the coast. Its preferred habitat is upon coastal sand dunes. Dwarf naupaka is a prostrate shrub that occurs in relatively hot, dry coastal sites on low, firmly packed, coastal sand dunes near sea level (USFWS 1997).

Native red hibiscus is a shrub or small tree that grows from 10 to 20 ft in height and is found in both dry and wet forests.

<u>Coastal</u>

This section identifies the federally listed marine species that are known to occur and/or may occur in the landing site areas. Coastal species are separated into four categories: corals, marine mammals, sea birds, and sea turtles, Figure 3.14-1 identifies marine parks and preserves in the MHI.

Corals

Although not listed or endangered, there are now 82 coral species that the NOAA (Brainard et al. 2011) have identified as candidate species for listing under ESA. As per NOAA regulations,

Candidate Species are those petitioned species that are actively being considered for listing as endangered or threatened under the ESA, as well as those species for which NOAA has initiated an ESA status review that it has announced in the FR (see Title 50 C.F.R. Part 424.02). NOAA candidate species also qualify as species of concern.

Many of these candidate species occur in Hawaiian waters. Should these species be listed as threatened or endangered, they would receive additional regulatory protection.

Marine Mammals

Cetaceans listed as endangered under the ESA and that have been observed in the Western Pacific Region are discussed below.

Humpback whales migrate through waters around the NWHI and occur off all eight Hawaiian Islands during the winter breeding season, but particularly within the shallow waters of the "four-island" region (Kahoʻolawe, Molokaʻi, Lānaʻi, and Maui); the northwestern coast of the island of Hawaiʻi; and the waters around Niihau, Kauai, and Oʻahu (WPRFMC 2009). Within the four-island region the NOAA and the State of Hawaiʻi jointly manage the HIHWNMS (discussed later under protected habitats) Humpback whales winter in shallow nearshore waters of usually 100 fm or less (WPRFMC 2009).

Sperm whales are found in tropical to polar waters throughout the world (Rice 1989). They are among the most abundant large cetaceans in the region. Sperm whales tend to inhabit areas with a water depth of 1,968 ft or more, and are uncommon in waters less than 984 ft deep. Female sperm whales are generally found in deep waters (at least 3,280 ft) of low latitudes (less than 40°, except in the North Pacific where they are found as high as 50°) (WPRFMC 2009). These conditions generally correspond to sea surface temperatures greater than 15°C, and while female sperm whales are sometimes seen near oceanic islands, they are typically far from land (WPRFMC 2009).

The blue whale is the largest living animal. They occur in all oceans, usually along continental shelves, but can also be found in the shallow inshore waters and on the high seas (WPRFMC 2009). The range of the blue whale is known to encompass much of the North Pacific Ocean, from Kamchatka to southern Japan in the west, and from the Gulf of Alaska and California south to at least Costa Rica in the east (WPRFMC 2009). Overall, it is clear that this species inhabits and feeds in both coastal and pelagic environments (WPRFMC 2009).

Fin whales are found throughout all oceans and seas of the world from tropical to polar latitudes (Forney et al. 2000). Although it is generally believed that fin whales make poleward feeding migrations in summer and move toward the equator in winter, few actual observations of fin whales in tropical and subtropical waters have been documented, particularly in the Pacific Ocean away from continental coasts (Reeves et al. 1999). There is insufficient information to

accurately determine the population structure of fin whales in the North Pacific, but there is evidence of multiple stocks (WPRFMC 2009). The status of fin whales in Hawaiian waters relative to the optimum sustainable population is unknown, and there are insufficient data to evaluate trends in abundance (Forney et al. 2000).

Sei whales have a worldwide distribution but are found mainly in cold temperate to subpolar latitudes rather than in the tropics or near the poles (Horwood 1987). They are distributed far out to sea and do not appear to be associated with coastal features. There are no data on trends in sei whale abundance in the North Pacific (Forney et al. 2000). It is especially difficult to estimate their numbers because they are easily confused with Bryde's whales, which have an overlapping, but more subtropical, distribution (Reeves et al. 1999).

Right whales have occurred historically in all the world's oceans from temperate to subpolar latitudes. They primarily occur in coastal or shelf waters, although movements over deep waters are known. During winter, right whales occur in lower latitudes and coastal waters where calving takes place. However, the whereabouts of much of the population during winter remains unknown. Thus it is possible right whales may occur during winter months in the waters of Hawai'i.

The Hawaiian monk seal is a tropical seal endemic to the Hawaiian Islands (WPRFMC 2009). There are six major reproductive sites in the Hawaiian Islands: French Frigate Shoals, Laysan Island, Lisianski Island, Pearl and Hermes Reef, Midway Atoll, and Kure Atoll (WPRFMC 2009). Small populations at Necker Island and Nihoa Island are maintained by both reproduction and immigration, although an increasing number of seals are distributed throughout the MHI where they are also reproducing (WPRFMC 2009).

The subpopulation of monk seals on French Frigate Shoals has shown the most change in population, increasing dramatically in the 1960s–1970s and declining in the late 1980s–1990s. In the 1960s–1970s, the other five subpopulations experienced declines. However, during the past decade, the number of monk seals increased at Kure Atoll, Midway Atoll, and Pearl and Hermes Reef while the subpopulations at Laysan Island and Lisianski Island remained relatively stable (WPRFMC 2009). The recent subpopulation decline at French Frigate Shoals is thought to have been caused by male aggression, shark attack, entanglement in marine debris, loss of habitat, and decreased prey availability (WPRFMC 2009). The Hawaiian monk seal is assumed to be well below its optimum sustainable population; since 1985, the overall population has declined approximately 3 percent per year (Forney et al. 2000).

Hawaiian monk seals feed on a variety of marine fauna. Parrish et al. (2000) found that the diurnal pattern of foraging by male adults occurred mainly at the 180 ft isobaths (WPRFMC 2009). A few seals foraged at depths of more than 1,500 ft (WPRFMC 2009).

Seabirds

Seabirds listed as threatened or endangered under the ESA and managed by USFWS that have been observed near the landing site areas are discussed below.

The short-tailed albatross is the largest seabird in the North Pacific, with a wingspan of more than 9 ft. The short-tailed albatross, which is listed as “endangered” under the ESA, is a migratory seabird that is known to be occasionally present in the NWHI.

Newell’s shearwater breeds on Kauaʻi, the island of Hawaiʻi, Molokaʻi, and Lehua. This species may also breed on Oʻahu, Maui, and Lānaʻi, but this has not been confirmed. In Hawaiʻi, shearwater often nest on the steep slopes of mountains and vertical cliffs. Shearwater forage along the coastline for fish species.

Sea Turtles

All Pacific sea turtles are designated under the ESA as either threatened or endangered. The five species of sea turtles that may occur in Hawaiian waters are highly migratory, or have a highly migratory phase in their life history (NMFS 2001). These species are discussed below.

Leatherback turtles are widely distributed throughout the oceans of the world and are found in waters of the Atlantic, Pacific, and Indian Oceans; the Caribbean Sea; and the Gulf of Mexico (Dutton et al. 1999). Leatherback turtles lead a completely pelagic existence, foraging widely in temperate waters, except during the nesting season when gravid (WPRFMC 2009). Migratory routes of leatherback turtles originating from eastern and western Pacific nesting beaches are not entirely known (WPRFMC 2009). Recent information on leatherbacks tagged off the west coast of the U.S. has also revealed an important migratory corridor from central California to south of the Hawaiian Islands, leading to western Pacific nesting beaches (WPRFMC 2009).

Hawksbill turtles are circumtropical in distribution, generally occurring from latitudes 30° N to 30° S within the Atlantic, Pacific, and Indian Oceans and associated bodies of water (NMFS and USFWS 1998b). The hawksbill turtle is listed as endangered throughout its range. In the Pacific this species is threatened by harvesting of the species for its meat, eggs, and shell, as well as the destruction of nesting habitat by human occupation and disruption (WPRFMC 2009). In 20 years of netting and hand-capturing turtles at numerous nearshore sites in the Hawaiian Islands, only eight hawksbills (all immatures) have been encountered. Capture sites have included Kiholo Bay and Kau (Hawaiʻi), Paloou (Molokaʻi) and Makaha (Oʻahu) (WPRFMC 2009).

Olive ridley turtles lead a highly pelagic existence (Plotkin 1994). These sea turtles appear to forage throughout the eastern tropical Pacific Ocean, often in large groups, or flotillas (WPRFMC 2009). The olive ridley turtle is omnivorous, and identified prey include a variety of benthic and pelagic organisms. Olive ridley turtles also forage at great depths, as a turtle was

sighted foraging for crabs at a depth of 915 ft (Landis 1965, in Eckert et al. 1986). While rare in Hawai‘i, olive ridleys have occasionally been killed by commercial fishing vessels. The entanglement of juveniles and adults in marine debris around the Hawaiian Islands is reported from Kailua-Kona (Hawai‘i), Pukoo (Moloka‘i), Hana (Maui), and O‘ahu (Balazs 1985).

The loggerhead turtle is characterized by a reddish-brown, bony carapace, with a comparatively large head, up to 10 inches wide in some adults (WPRFMC 2009). The loggerhead sea turtle is listed as threatened under the ESA throughout its range, primarily due to direct take, incidental capture in various fisheries, and the alteration and destruction of its habitat (WPRFMC 2009). In general, during the last 50 years, North Pacific loggerhead nesting populations have declined 50–90 percent (Kamezaki et al. 2003).

Green turtles are a circumglobal and highly migratory species, nesting and feeding in tropical/subtropical regions (WPRFMC 2009). Green sea turtles are known to live in pelagic habitats as post-hatchlings/juveniles, feeding at or near the ocean surface (WPRFMC 2009). The breeding population lives primarily in bays and estuaries, and is rarely found in the open ocean (Bjorndal 1997).

Green turtles in Hawai‘i are considered genetically distinct and geographically isolated, In Hawai‘i, green turtles nest on six small sand islands at French Frigate Shoals, a crescent-shaped atoll situated in the middle of the Hawai‘i Archipelago (Northwestern Hawaiian Islands) (Balazs et al. 1995). Ninety to 95 percent of the nesting and breeding activity occurs at the French Frigate Shoals. Nesting also occurs at Laysan Island, Lisianski Island, and on Pearl and Hermes Reef.

National Parks, Wildlife Refuges and Sanctuaries, and State Reserves and Sanctuaries

National Parks, wildlife refuges, sanctuaries, and state reserves and parks located either within or near the landing site areas are depicted on study area maps.

National Parks

The National Park System, operated by the National Park Service (NPS) of the U.S. Department of Interior, was established to preserve natural areas (including scenery, natural and historic features, and wildlife) in the U.S. so that they can be enjoyed by current generations and preserved for future generations. The protection, management, and administration of these areas are to be conducted in light of the high public value and integrity of the National Park System. There are eight national park units in Hawai‘i:

National Wildlife Refuges

Over 500 National Wildlife Refuges (NWRs) across the U.S. form a system of habitats managed by USFWS of the U.S. Department of Interior. Hawai‘i’s wildlife refuges were established to protect the Islands’ unique native plants and animals and their habitats. There are 10 wildlife refuges in Hawai‘i.

State Natural Area Reserves

The State Natural Area Reserve system (NARS) was established to preserve in perpetuity specific land and water areas that support communities, as relatively unmodified as possible, of the natural flora and fauna, as well as geological sites, of Hawai‘i (HRS Chapter 195). The NARS are managed by DLNR, DOFAW. Each Natural Area Reserve was established based on the concept of protecting ecosystems rather than individual species, with the goal of preserving and protecting representative samples of Hawaiian biological ecosystems and geological formations. There are 19 NARS in Hawai‘i covering more than 109,000 acres (ac).

State Forest Reserves

The State Forest Reserves were first established in Hawai‘i over a century ago to protect the water supply that was being threatened due to the destruction of the forest by cattle (HRS Chapter 183). The Forest Reserves are managed by DOFAW. Limited collecting for personal use (e.g., leaves and bamboo) and limited (no more than $3,000 value per year) commercial harvesting of timber, seedlings, greenery, and tree ferns are allowed by permit. There are 49 forest reserves on the five major islands (Kaua‘i, O‘ahu, Maui, Moloka‘i, and Hawai‘i), totaling over 640,000 ac; most of the state land in the conservation district is within a forest reserve.

State Restricted Watersheds

The purpose of a State Restricted Watershed is to regulate human use in areas where water supplies are vulnerable to contamination by public access (HAR Title 13 Chapter 105-1 et seq.). Six restricted watersheds on O‘ahu (3) and Hawai‘i (3) have been established and are managed by DOFAW.

State Wildlife Sanctuaries

Wildlife Sanctuaries are established by the State to conserve, manage, and protect indigenous wildlife (HAR Title 13 Chapter 125-1 et seq.). There are four wildlife sanctuaries in the state of Hawai‘i.

State Seabird Sanctuary

The State Seabird Sanctuary is managed by the Hawai‘i DOFAW. Regulations in HAR Title 13 Chapter 125, protect wildlife and plants and restrict human activities in seabird sanctuaries. Federal law also protects seabirds, shorebirds, and threatened or endangered species.

State Parks

There are 52 state parks encompassing nearly 25,000 ac on all the MHI. These parks are managed for outdoor recreation and heritage opportunities and range from landscaped grounds with developed facilities to wildland areas with trails and primitive facilities.

3.14.2 Regulatory Setting

The cable system implementation will need to comply with the requirements of the State's environmental review process set forth by Chapter 343 of the HRS, also known as the Hawai‘i Environmental Policy Act (HEPA) as well as in compliance with the National Environmental Policy Act (NEPA), as implemented by the Council on Environmental Quality (CEQ) Regulations (Title 40 C.F.R. Parts 1500–1508 [1997]) and any applicable federal agency regulations implementing NEPA.

The cable system implementation requires substantial involvement and approval of more than one agency at both the federal and state levels. Those regulations and approvals applicable to terrestrial and coastal biological resources are discussed below.

Federal Endangered Species Act[11]

Enacted in 1973, the federal Endangered Species Act (ESA) provides for the conservation of threatened and endangered species and their ecosystems. The ESA prohibits the "take" of threatened and endangered species except under certain circumstances and only with authorization from USFWS or NMFS (a part of NOAA) through a permit under Section 4(d), 7, or 10(a) of the ESA. Under the ESA, "take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect; or to attempt to engage in any such conduct. Section 7 of the ESA outlines procedures for federal interagency cooperation to conserve federally listed species and designated critical habitat. The ESA mandates that all federal agencies participate in the conservation and recovery of listed threatened and endangered species and that each agency ensure that any action they authorize, fund, or carry out does not jeopardize the continued existence of a listed species or its critical habitat. Formal consultation under Section 7 of the ESA is required if a proposed cable system implementation has the potential to affect (i.e., "take") a federally listed species that have been detected within or adjacent to a proposed landing site area.

[11] 16 U.S.C. §§ 1531–1544.

Migratory Bird Treaty Act[12]

Congress passed the Migratory Bird Treaty Act (MBTA) in 1918 to prohibit the kill or transport of native migratory birds, or any part, nest, or egg of any such bird unless allowed by another regulation adopted in accordance with the MBTA. The prohibition applies to birds included in the respective international conventions between the U.S. and Great Britain, the U.S. and Mexico, the U.S. and Japan, and the U.S. and Russia. There is no requirement to obtain a permit under the MBTA; however, a proposed cable system implementation must comply with measures that would avoid or minimize effects on migratory birds.

EO 11990, Protection of Wetlands[13]

EO 11990 is an overall wetlands policy for all agencies managing federal lands, sponsoring federal projects, or providing federal funds to state or local projects. EO 11990 requires that when a construction project involves wetlands, a finding must be made by the federal agency that there is no practicable alternative to such construction, and that the cable system implementation includes all practicable measures to minimize impacts on wetlands resulting from such use. It requires federal agencies to follow avoidance, mitigation, and preservation procedures, with public input, before proposing new construction in wetlands, and generally requires minimization of activities in wetlands, and coordination with USACE regarding wetlands mitigation.

EO 13989 Coral Reef Protection

EO 13089 calls for a unified approach for increased preservation, protection, and restoration of health of coral reef resources. The EO mandates that all federal agency actions that affect U.S. coral reef ecosystems shall (a) identify their actions that may affect U.S. coral reef ecosystems; (b) utilize their programs and authorities to protect and enhance the conditions of such ecosystems; and (c) to the extent permitted by law, ensure that any actions they authorize, fund, or carry out will not degrade the conditions of such ecosystems.

Federal Water Pollution Control Act (Clean Water Act)[14]

The Federal Water Pollution Control Act was first passed by Congress in 1948 and was later amended and became known as the Clean Water Act (CWA). The CWA establishes the basic structure for regulating discharges of pollutants into the “waters of the U.S.,” It gives USEPA the authority to implement pollution control programs, including setting wastewater standards for industry and water quality standards for contaminants in surface waters.

[12] 16 Title U.S.C. Sections 703–712.
[13] EO 11990, 1977.
[14] 33 Title U.S.C. Sections 1251–1387.

The CWA was enacted to protect surface water quality in the U.S. under Section 404 of the CWA (Title 33 U.S.C. Section 1344), USACE approval is required for the placement of dredged or fill material in waters of the U.S. Under Section 401 of the CWA, Title 33 U.S.C. Section 1341, the state where dredged or fill material would be placed in waters of the U.S. must certify that the action would not contravene the state's water quality standards.

The term "waters of the U.S." includes navigable lakes, rivers, streams, tributaries to navigable waters, all waters that are subject to the ebb and flow of the tide, and interstate waters and tributaries. Waters of the U.S. also include wetlands adjacent to any of the above and all other waters of the U.S. not identified above, such as intermittent streams and other waters, the destruction of which could affect interstate or foreign commerce.

As defined in Title 33 C.F.R. Part 328.4(b), under Section 404 of the CWA, the landward limits of USACE jurisdiction in tidal waters extends to the high tide line. The term "high tide line" means the line of intersection of the land with the water's surface at the maximum height reached by a rising tide. Thus, for this report, freshwater bodies are those waters above the high tide line.

CWA Section 401

Every applicant for a federal permit or license for any activity that may result in a discharge to a water body must obtain a State Water Quality Certification for the proposed activity and comply with state water quality standards prescribed in the certification.

CWA Section 402

CWA Section 402 sets forth regulations that prohibit the discharge of pollutants into waters of the U.S. from any point source without obtaining an NPDES permit. HDOH and the Division of Aquatic Resources-Hawai‘i (HIDAR) implement the NPDES and the State's water quality programs by regulating point-source discharges of wastewater and agricultural runoff to both land and surface waters to protect their beneficial uses.

Sustainable Fisheries Act of 1996[15]

The Sustainable Fisheries Act of 1996 reauthorized and amended the MSA[16] by providing a number of new mandates for NMFS, regional fishery management councils, and other federal agencies to identify and protect important marine and anadromous fish habitat (Rosenberg et al. 2000). The councils, with assistance from NMFS, are required to delineate EFH for all managed species. The Sustainable Fisheries Act defines EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity." Federal action agencies that fund,

[15] P. L. 104–297.
[16] Title 16 U.S.C. Sections 1801–1884.

permit, or carry out activities that may adversely impact EFH are required to consult with NMFS regarding the potential effects of their actions on EFH and respond in writing to NMFS recommendations.

As required by the MSA, NMFS promulgated regulations to provide guidance to the regional fishery management councils for EFH designation. The regulations further clarify EFH by defining waters, to include aquatic areas and their associated physical, chemical, and biological properties that are used by fish, which may encompass a substrate to include sediment, hard bottom, structures underlying the waters, and associated biological contribution to a healthy ecosystem; and areas used for spawning, breeding, feeding, or growth to maturity to cover a species' full life cycle.

Marine Mammal Protection Act[17]

The Marine Mammal Protection Act (MMPA) of 1972 establishes a federal responsibility for the protection and conservation of marine mammal species. The primary authority for implementing the act belongs to NMFS. The MMPA prohibits, with certain exceptions, the take of marine mammals in U.S. waters and by U.S. citizens in international waters, and the importation of marine mammals and marine mammal products into the U.S. Take is defined to include the harassment, hunting, capture, killing, or collecting, or the attempt of such actions, of any marine mammal (Title 16 U.S.C. Section 1362-13).

Under the 1994 amendments to the MMPA, harassment is statutorily defined as, any act of pursuit, torment, or annoyance:

- *Level A Harassment* – has the potential to injure a marine mammal or marine mammal stock in the wild; or
- *Level B Harassment* – has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering but which does not have the potential to injure a marine mammal or marine mammal stock in the wild (Title 16 U.S.C. Section 1362-17).

Coastal Zone Management Act

The federal CZM Program was created through passage of the CZM Act of 1972. Hawai'i's CZM Program was enacted to provide a common focus for state and county actions dealing with land and water uses and activities. As the State's resource management policy umbrella, it is the guiding perspective for the design and implementation of allowable land and water uses and activities throughout the state. The CZM area encompasses the entire state. Because there is

[17] Title 16 U.S.C. Sections 1361–1407.

no point of land more than 30 miles from the ocean, a definite land-sea connection exists throughout the state (DBEDT 2012).

In Hawai‘i, the OP administers HRS Chapter 205A, the CZM law. The SMA permitting system is part of the CZM Program approved by federal and state agencies. The SMA permit was established in 1975 with the enactment of Act 176, known as the Shoreline Protection Act. The legislature in enacting Part II of HRS Chapter 205A found that "…special controls on developments within an area along the shoreline are necessary to avoid permanent losses of valuable resources and the foreclosure of management options, and to ensure that adequate access, by dedication or other means, to public owned or used beaches, recreation areas, and natural reserves is provided." (DBEDT 2012).

The legislature further found and declared that it is state policy to preserve, protect, and where possible, to restore the natural resources of the coastal zone of Hawai‘i. Pursuant to HRS Chapter 205A-5, all state and county agencies shall enforce the CZM objectives and policies defined in HRS Chapter 205A-2 (DBEDT 2012).

State and Local Permits

Because of the overlapping agency jurisdictions and responsibilities, the cable system implementation will involve federal, state, and county reviews, approvals, and permits. Once the scope of the cable system implementations is clearly defined, the EIS will outline the range of permits that may be required and the best way to phase them to facilitate regulatory compliance. State permits for impacts to ecological resources may include those described below.

Stream Channel Alteration Permit

A Stream Channel Alteration Permit (SCAP) is required for proposed activities that would alter a stream channel or instream flow characteristics. In Hawai‘i, the SCAP is administered by DLNR and Commission on Water Resource Management.

Special Management Area Permit

The SMA permit regulates permissible land uses that are already allowed by land use policies including zoning designations, county general plans, and community development plans. A SMA permit is required for any development within the SMA boundary, including construction, reconstruction, demolition, or alteration of the size of any structure. SMA permits are administered by County Planning Departments.

Conservation District Use (CDUA) Permit

Pursuant to HRS, Chapter 183C and Chapter 190D, the Board of Land and Natural Resources regulates marine activities (i.e., ocean thermal energy conversion [OTEC]; mariculture; and other energy or water, research, scientific, and educational activities in, on, or under state marine waters or submerged lands) by the issuance of a CDUA Permit. The applicant must also contact the appropriate Land Division office to lease marine waters for marine activities (OCCL 2005).

Wetlands and Water Quality Permits

The Section 401, CWA, Water Quality Certification process is administered by HDOH. Section 401 permits are required for proposed cable system implementation that must obtain the following permits: (1) federal permit to construct or operate a facility that may discharge polluted waters into navigable waters; (2) Section 404, CWA, dredge and fill permits administered by USACE; (3) Section 10, Harbors and Rivers Act, permits; (4) USCG bridge permit; and Section 402, CWA, permits NOT issued or administered by the State. (All State-issued Section 402 permits do not require a Section 401 permit.) A Section 404, CWA, general permit from USACE is required for discharge of dredged or fill material into waters of the U.S., including wetlands. This permit is required in navigable waters or where depletion of commercial fish

3.14.3 Region of Influence

To provide for an appropriate environmental analysis, ROI areas were established for the terrestrial and coastal biological resources (e.g., flora, fauna, habitats, etc.) that are important or that are protected under federal law or statute. For the terrestrial biological resources, the ROI is identified as up to 0.6 mile inland from the high tide line within the identified landing site areas for each island (see Figure 2-1). For the coastal biological resources, the ROI extends the width of the landing site areas from the high tide line seaward for a distance of 10,000 ft.

Resource-specific information for the ROIs is based on federal and state GIS databases and other available data (e.g., Integrated Natural Resource Management Plans [INRMP], previous studies, etc.).

3.14.4 Affected Environment

This section identifies the existing conditions for the seven landing site areas. For descriptions of the habitats and species, refer to Section 3.14.1.

Maui

This section identified the Kahului Harbor and Kapalua landing site areas on the island of Maui.

Maui-Kahului Harbor

The Maui-Kahului Harbor landing site area is a crescent-shaped parcel on the north coast of the island of Maui. The eastern half of the landing site area is generally flat with elevations less than 20 ft AMSL. The western portion of the landing site area contains a flat plain along the coast with increasing elevations landward. Maximum elevations are over 200 ft AMSL. The landing site area occupies much of the city of Kahului and the airport.

Terrestrial and Wetlands Resources

Habitats

Within the landing site area, 11 different habitats are identified (Figure 3.14-2). These habitats are active agriculture, alien forest, alien grassland, alien shrubland, alien shrubs and grasses, high-density developed, kikuyu grass grassland/pasture, low-density developed, uncharacterized open-sparse vegetation, very sparse vegetation to unvegetated, and water. Table 3.14-3 identifies the percentage of habitat types within the landing site area. Low-density developed habitats dominate the area, accounting for approximately 711 ac (34.68 percent), whereas alien shrubland is least dominant, consisting of 3.5 ac of habitat area (< 1 percent).

The landing site area is highly developed with over 60 percent of the land area being classified as high- and/or low-density developed cover types. These habitats are of low ecological value due to constant anthropogenic perturbations. Pockets of undeveloped habitats exist within the landing site area and are associated with areas of open waters, wetlands, alien grasslands, and forests and parks. The greatest concentrations of undeveloped habitats can be found east of Kahului Harbor and are primarily associated with Kanaha Beach Park.

Wetlands

There are five different wetland classifications within the landing site area; they are depicted in Figure 3.14-3. These wetland classifications are estuarine and marine deepwater, freshwater emergent wetland, freshwater forested/shrub wetland, freshwater pond, and lake. Table 3.14-4 identifies the relevant wetland types as well as the corresponding acreages.

Freshwater wetlands dominate all wetland types within the landing site area; they encompass over 228 ac and account for over 95 percent of the total wetland area. Within the landing site area, there are several large freshwater wetland complexes. In between Kahului and the airport, within the Kanaha Pond State Wildlife Sanctuary, an emergent and scrub/forested wetland occurs in association with Kanaha Pond. In the western portion of the landing site area just north of Nehe Point, a large emergent freshwater wetland occurs and is associated with Paukukalo marsh. Several other smaller freshwater emergent wetland complexes occur in association with perennial and nonperennial streams, including Iao and Waiehu streams. Marine

wetlands along the coastline of Kahului Harbor are classified as estuarine subtidal wetlands with an unconsolidated bottom. Outside the harbor's breakwaters and along the coastline to the east, wetlands are classified as marine.

Surface Waters (nonsaline)

There are two perennial streams located in the western portion of the landing site area and one nonperennial stream located near the airport in the eastern portion of the landing site area (Figure 3.14-3). Freshwater ponds and lakes are associated with the large wetland complex east of the city. All water bodies in the landing site area are classified as Class II waters.

Protected Habitats

Kanaha Pond State Wildlife Sanctuary is a 143-acre park located east of Hobron Point (Figure 3.14-4). The park contains fish ponds and is habitat for the Hawaiian duck, Hawaiian coot, and Hawaiian stilt. Though owned by the state, it has been designated by NPS as a National Natural Landmark due to important waterbird habitat that occurs there, though that designation carries no additional regulations (NPS 2011). However, it is a state park and therefore protected from development.

Haleki'i-Pihana Heiaus State Monument is a 10-acre state park located on a ridge southwest of Nehe Point (Figure 3.14-4). As a state park, it is protected from development. The park offers some natural habitats (shrub and grassland) though the park is surrounded by high- and low-density developed habitats.

Coastal Resources

The coastal marine environment that occurs in this landing site area includes approximately 20,580 linear ft of shoreline and 6,526 ac of marine habitat. Much of the landing site area is composed of depths of less than 150 ft (Figure 3.14-5). Within the harbor, water depths are less than 30 ft. East of the harbor, depths of less than 10 ft predominate and occur over 1,000 ft from the shoreline. Shallow depths occur west of the harbor but tend to be closer to the shoreline as compared to the bathymetry east of the harbor.

Coral Reefs and other Benthic Habitats

According to the data provided in NOAA's habitat mapper, mapped benthic habitats include the following: aggregate reef, artificial, land, mud, pavement, rock/boulder, sand, spur and groove, and unknown (Figure 3.14-5).

Table 3.14-5 identifies the percentage of these mapped habitats and corresponding acreages within the landing site area. Sand is the most dominant mapped benthic cover type comprising

approximately 2.3 ac. Artificial habitat is the least dominant comprising 15.3 ac. In both the eastern and western portions of the landing site area, the shallow depths contain benthic habitats that are dominated by corals and coral reefs. These habitats include aggregated patch reefs and spur and groove. Within the harbor, habitats consist largely of mud, with some sand and aggregated patch reef areas. North of the harbor, a large portion of the benthic habitat is composed of sand.

Based on the findings of other studies in Hawai‘i, it is anticipated that below 100 ft in depth, corals begin to become less numerous and smaller in size. As corals begin to lessen at deeper depths, the benthic cover types are dominated by rock, sediments, or detrital mats.

Open Water

The waters of the landing site area are classified as Class A by the State of Hawai‘i. Due to the confining nature of the breakwaters, the harbor waters have less of a hydrologic exchange than the other portion of the landing site area.

Protected Habitats

The Kahului Bay Fisheries Management Area (FMA) occurs within the landing site area (Figure 3.14-6). The FMA is regulated by HIDAR. The FMA is composed of three separate areas and is located within harbor’s breakwaters (HIDAR 2012a). Limited fishing activities are permitted. All taking of marine life within the FMA must be monitored by a fisher station (HIDAR 2012a).

Coastal Zone Management – Special Management Area

Much of the landing site area is designated as CZM-SMA, including the entire landing site area east of the harbor. The CZM-SMA is depicted in Figure 3.14-6.

Essential Fish Habitat

The bathymetry and habitats present in the Maui-Kahului Harbor landing site area up to 300 ft (50 fm) would be regulated under EFH. Habitats adjacent to the landing site area likely support a variety of EFH species and their life stages including egg, larvae, juvenile, and adult life stages of the spiny and slipper lobster complex, and the Kona crab, bottomfish, and coral reef complexes. None of the six designated EFHs for deep-water precious corals, nor the three beds known for shallow-water precious corals, are located near this landing site area.

Threatened and Endangered Species

Terrestrial

Several protected species are known to occur in the landing site area. Designated critical habitat for Blackburn's sphinx moth occurs in the area of Kanana Beach and the Kanaha Pond State Wildlife Sanctuary in the eastern portion of the landing site area.

The Hawaiian coot, Hawaiian duck, and Hawaiian stilt are known to utilize Kanaha Pond State Wildlife Sanctuary. The pond and surrounding habitats have been designated as critical habitats for waterbirds.

Dwarf naupaka is known to occur near Kahului Harbor and northwest along the coast.

Coastal

There are no known turtle nesting sites in the landing site area. Sea turtle species would be unlikely to occur in the shallow waters of the landing site area.

There is no known occurrence of monk seals utilizing the beaches as haulout or pupping areas. However, the presence of sandy beaches and shallow water marine environments would not preclude monk seals from occasionally using the coastal resources of the landing site area. NMFS has proposed the waters around Maui to a depth of 500 m and the island's beaches as critical habitat for the monk seal. The entire landing site area, except Kahului Harbor, would be covered under this proposal.

<u>Maui-Kapalua (West Maui)</u>

The Maui-Kapalua landing site area is a crescent-shaped parcel located on the island's northwest coast. The landing site area is marked by numerous steep slopes that vary from high cliffs 80 ft AMSL along the shoreline to numerous steep ravines associated with drainage ways. Elevations vary in the landing site area from sea level to over 280 ft AMSL.

Terrestrial and Wetlands Resources

Habitats

Within the landing site area, 11 different habitats are identified (Figure 3.14-7). These habitats are active agriculture, alien forest, alien grassland, alien shrubland, alien shrubs and grasses, high-density developed, kikuyu grass grassland/pasture, low-density developed, uncharacterized open-sparse vegetation, very sparse vegetation to unvegetated, and water. Table 3.14-6 identifies the habitat types and corresponding acreages within the landing site

area. The alien forest cover type encompasses just over 383 ac (34.1 percent) within the landing site area, making it the most dominant. Alien shrubland is the least dominant cover type here, totaling 2.1 ac (< 1 percent of the total landing site area).

Most of the landing site area (over 63 percent) is composed of vegetated habitats. Forested ravines associated with drainage courses occur in the landing site areas and are associated with larger contiguous habitats east of the landing site area. Alien grasslands and active agriculture are also well represented, but are limited to the flatter and dryer terrain upland of the ravines. A large, uninterrupted concentration of active agriculture can be found at the northernmost portion of the landing site area, in the vicinity of Lipoa Point. Pockets of low-density development exist throughout the landing site area south of Honolua Bay, with the greatest concentration at the far western end of the parcel in Honokahua.

Wetlands

There are no mapped freshwater wetlands in the landing site area (Figure 3.14-8). All waters below the high tide line are identified as marine, subtidal, unconsolidated bottom habitats.

Surface waters

One perennial stream and two nonperennial streams flow through the landing site area (Figure 3.14-8). All water bodies in the landing site area are classified as Class II waters.

Protected Habitats

There are no protected habitats in the landing site area (Figure 3.14-9).

Coastal Resources

The coastal marine environment in the landing site area includes approximately 20,580 linear ft of shoreline and 6,236 ac of the marine environment. Water depths less than 100 ft occur up to a distance of 3,000 ft from the shoreline. The depths increase to over 380 ft at a distance 10,000 ft from shore.

Coral Reefs and other Benthic Habitats

Mapped benthic habitats in the landing site area include aggregate reef, land, pavement, pavement with sand channels, rock/boulder, sand, and unknown (Figure 3.14-10). In the landing site area, boulder and rock benthic habitats tend to dominate around headlands. Aggregated patch reefs occur at depths below 30 ft.

Table 3.14-7 identifies the acreages of these mapped habitats within the landing site area. Unknown is the most dominant cover type comprising 4,851 ac. Aggregate reef is the least dominant comprising 9.6 ac. In both the eastern and western portions of the study areas, the shallow depths contain benthic habitats that would be dominated by coral reefs. These habitats include aggregated patch reefs, spur, and groove.

Based on the findings of other studies in Hawai‘i, it is anticipated that below 100 ft in depth, the marine benthic community begins to change. The attenuation of sunlight reduces the presence of corals and other marine organisms that depend on sunlight. The benthic cover types begin to be dominated by rock, sediments, or detrital mats.

Open Water (saline)

The waters of the landing site area are classified as Class A by the State of Hawai‘i.

Protected Habitats

The Honolua-Mokuleia Bay Marine Life Conservation District is regulated by HIDAR (under HAR Title 13 Chapter 32) (DLNR undated). It encompasses a 45-ac area located about 10 miles northwest of Lahaina (HIDAR 2012b) (Figure 3.14-11). It includes a portion of the submerged lands and overlying waters of Honolua Bay and Mokuleia Bay (seaward to a line from ‘Alaelae Point to Kalaepiha Point, then to the point at the northwestern corner of Honolua Bay) (HIDAR 2012b). It is prohibited to take marine life or alter any sand, geology, or coral unless under a permit (HIDAR 2012b).

The waters of the landing site area are within the HIHWNMS (Figure 3.14-1). The HIHWNMS lies within the shallow (less than 600 ft), warm waters surrounding the main Hawaiian Islands (area of Maui; Penguin Bank, and off the north shore of Kauai, the north and south shores of O‘ahu, and Kohala coastline off the island of Hawai‘i [Figure 3.14-1]) and constitutes one of the world’s most important humpback whale habitats. Designated in 1992, some 1,370 square miles are protected. Scientists estimate that two-thirds of the entire North Pacific humpback whale populations migrate to Hawaiian waters each winter to engage in breeding, calving, and nursing activities (NMFS 2012). Refer to Section 3.14.4.3 for a description of the sanctuary.

Coastal Zone Management – Special Management Area

Large portions of the landing site area are designated as County of Maui CZM –SMA. Figure 3.14-11 identifies the extent of this area.

Essential Fish Habitat

The bathymetry and habitats present in the –west Maui landing site area up to 300 ft (50 fm) would be regulated under EFH. Habitats adjacent to the landing site area likely support a variety of EFH species and their life stages, including egg, larvae, juvenile, and adult life stages of the spiny and slipper lobster complex and the kona crab, bottomfish complexes, and coral reef complexes. None of the six designated EFHs for deep-water precious corals, nor the three beds known for shallow-water precious corals, are located near this landing.

Threatened and Endangered Species

Terrestrial

There are no known occurrences of threatened or endangered species in the landing site area.

Coastal

There are no known turtle nesting sites in the landing site area.

The humpback whale would be expected in the waters off of this landing site area during the winter months for calving. Other whale species, if present, would likely only use the deeper water portions of the landing site area during migration.

There is no known occurrence of monk seals utilizing the beaches as haulout or pupping areas. However, the presence of sandy beaches and shallow water marine environments would not preclude monk seals from occasionally using the coastal resources of the landing site area. NMFS has proposed the waters around Maui to a depth of 500 m and the island's beaches as critical habitat for the monk seal. If accepted, the entire landing site area would be designated as critical habitat.

There is evidence from radar observations that Newell's shearwater may be present on Maui, possibly being most common in western Maui (IUCN 2012). Due to the steep cliffs within this landing site area, this species would likely utilize this area for nesting and foraging.

Lānaʻi – Landing Site Area

The northwesternmost point of the island of Lānaʻi is dominated by a peninsula that juts out from the island's west coast. The Lānaʻi landing site area occupies the northern and southern coastlines of this peninsula. In the northern portion of the peninsula, elevations vary from sea level to approximately 250 ft. In the southern portion of the peninsula, much steeper slopes are encountered and elevations range from sea level to over 700 ft.

Terrestrial and Wetlands Resources

Habitats

Within the landing site area eight different habitats are identified (Figure 3.14-12). These habitats are alien grassland, fountain grass/buffel grass grassland, kiawe forest and shrubland, kiawe-koa haole forest and shrubland, koa haole shrubland, low-density developed, very sparse vegetation to unvegetated, and water. Table 3.14-8 identifies the habitat types and corresponding acreages within the landing site area. Kaiwe forest and shrubland is the most dominate habitat found within the landing site area, comprising approximately 2,201 ac (38.57 percent), with low-density developed possessing the least amount of overall land cover, at 12.5 ac (< 1 percent).

As indicated in Table 3.14-8, the landing site area is virtually undeveloped. The slopes and ravines that form the landing site area are largely dominated by forests and shrublands, which make up nearly 70 percent of the total habitat cover types. Along the southern coast, a large area of grassland occurs, with fountain grass/buffel grass grassland (both invasive species) being the dominant grassland cover type. Due to their invasive nature, these grasses compete with native species for nutrients and water, eliminating the competition and lowering the ecological value of the area. Additionally, the presence of these grasses increases the potential for wild fires. The low-density developed portion of the landing site area is primarily associated with the Kanepuʻu Highway, which transects the area in a north/south orientation between Honowae and Shipwreck Beaches.

Wetlands

There are no freshwater wetlands mapped within the landing site area (Figure 3.14-13). Estuarine and marine wetlands are mapped as marine subtidal unconsolidated bottom or marine subtidal coral reefs. These wetlands occur fairly uniformly along the coastline of the landing site area.

Surface waters (Nonsaline)

Freshwater aquatic habitats are composed of over 55 nonperennial streams that are incised into the slopes (Figure 3.14-13). All of the streams in the landing site area flow toward the ocean. All water bodies in the landing site area are classified as Class II waters.

Protected Habitats

The entire landing site area is part of the Lānaʻi cooperative Game Management Area (GMA) (Figure 3.14-14). In Hawaiʻi, GMAs are managed by DLNR.

Coastal Resources

The coastal marine environment includes approximately 84,670 linear ft of shoreline and approximately 21,155 ac of marine habitat. Within the landing site area, the 100 ft contour usually occurs within 1,500 ft from the shoreline. In the southern portion of the landing site area, the water depth increases to over 900 ft at a distance of 10,000 ft from the shoreline. In the northern portion of the landing site area, the slope is more gradual and maximum depths vary between 200 to 500 ft at a distance of 10,000 ft from the shoreline.

Coral Reefs and Other Benthic Habitats

Mapped benthic habitats include the following: aggregate reef, artificial, land, pavement, rock/boulder, rubble, sand, and unknown (Figure 3.14-15). Table 3.14-9 identifies the acreages of these mapped habitats within the landing site area. Unknown habitat is the most dominant cover type comprising roughly 18,499 ac. Artificial (shoreline) is the least dominant comprising less than 1 ac.

In the southern portion of the landing site area, benthic habitats are limited and are composed of sand, rocks, and boulders. In the northern portion of the landing site area, the benthic community is more diverse with habitats that have higher percentages of coral and individual patch reefs.

Based on the findings of other studies in Hawai‘i, it is anticipated that below 100 ft in depth, the marine benthic community begins to change. The attenuation of sunlight reduces the presence of corals and other marine organisms that depend on sunlight. The benthic cover types begin to be dominated by rock, sediments, or detrital mats.

Open Water

The waters of the landing site area are classified as Class AA waters by the State of Hawai‘i. There are no permanent streams that drain to the landing site area.

Protected Habitats

The HIHWNMS surrounds this landing site area (Figure 3.14-1). Refer to the text provided for the Maui-Kapalua landing site area for a description of this resource.

Coastal Zone – Special Management Area

The extent of the CZM-SMA is depicted in Figure 3.14-16. As depicted in the figure, the County of Maui-designated CZM-SMA covers the beach in the landing site area.

Essential Fish Habitat

The bathymetry and habitats present in the Lānaʻi landing site area up to 300 ft (50 fm) would be regulated under EFH. Habitats adjacent to the Lānaʻi landing site area likely include a variety of EFH species and their life stages, including the egg, larvae, juvenile, and adult life stages of the spiny and slipper lobster complex and the kona crab, bottomfish complexes, and coral reef complexes. None of the six designated EFHs for deep-water precious corals, nor the three beds known for shallow-water precious corals, are located near this landing.

Threatened and Endangered Species

Terrestrial

There are no known occurrences of threatened and endangered species within and/or immediately adjacent to the landing site area.

Coastal

There are no known turtle nesting sites in the landing site area.

The humpback whale would be expected in the waters off of this landing site area during the winter months for calving. Other whale species, if present, would likely only use the deeper water portions of the landing site area during migration.

There is no known occurrence of monk seals utilizing the beaches as haulout or pupping areas. However, the presence of sandy beaches and shallow water marine environments could be suitable for monk seals to use the coastal resources of the landing site area. NMFS has proposed the waters around Lānaʻi to a depth of 500 m and the island's beaches as critical habitat for the monk seal. The entire landing site area would be covered under this proposal.

Molokaʻi

This section describes the Kaluakoi and Kaunakakai landing site areas on the island of Molokaʻi.

Molokaʻi Kaluakoi (West Molokaʻi)

The Molokaʻi Kaluakoi landing site area occupies a portion of the northern coast from Molio Point to ʻIlio Point and a portion of the western coast from ʻIlio Point to Kahaiawa Point. The topography of the northern shoreline contains steep cliffs with elevations in excess of 200 ft along the shoreline. Maximum elevations of 600 ft occur in the northernmost portion of the landing site area. Along the western shoreline, slopes are more gradual with large portions of the landing site area less than 100 ft in elevation.

Terrestrial and Wetlands Resources

Habitats

Within the landing site area 11 different habitats are identified (Figure 3.14-17). These habitats are alien forest, alien grassland, alien shrubs and grasses, kiawe forest and shrubland, kiawe-koa haole forest and shrubland, koa haole shrubland, lantana shrubland, low-density developed, mixed lantana and Christmas berry shrubland, very sparse vegetation to unvegetated, and water. Table 3.14-10 identifies the acreages of habitat types within the landing site area. The largest habitat type within the Molokaʻi Kaluakoi landing site area is Kiawe forest and shrubland, which accounts for approximately 1,805 ac, nearly half of the total area (45.4 percent). Mixed lantana and Christmas berry shrubland comprise the smallest habitat area at approximately 1.5 ac (< 1 percent).

Much of the landing site area is undeveloped. Large vegetated habitats include Kiawe forest and scrubland as well as alien shrubs and grasses. In the northern portion of the landing site area and in areas of higher elevations and steep slopes, Kiawe forest and scrubland predominates. Grasslands predominate in areas of lower elevation. Very sparse vegetation to unvegetated habitats are uniformly distributed throughout the landing site area, but are primarily concentrated along the coastline to the north. Low-density developed habitats occur along the major area thoroughfares.

Wetlands

With the exception of a small (< 0.5 ac) freshwater pond along Papohaku Beach, no freshwater wetlands are mapped within the landing site area (Figure 3.14-18). Below the high tide line, marine wetlands are classified as subtidal unconsolidated bottom.

Surface Waters (Nonsaline)

Within the landing site area, 13 nonperennial streams occur (Figure 3.14-18). All streams flow to the western shoreline. No other surface water resources occur in the landing site area.

Protected Habitats

On the western shoreline, a critical habitat is identified for waterbirds (Figure 3.14-19). The area is located along the coast between the Puʻu o kaiaka Stream and the Kakaʻako Gulch.

Coastal Resources

The coastal marine environment includes approximately 61,540 linear ft of shoreline and approximately 15,799 ac of marine habitat. There is a marked difference in the bathymetry of

the north coast and west coast of the landing site area. Along the north coast, the 100 ft depth contour occurs within 1,000 ft of the shoreline. Along the west coast, the 1,000 ft contour line occurs at a distance of 2,000 to 5,000 ft from the shoreline. The maximum depth in the landing site area is over 350 ft, which occurs at a distance of 10,000 ft from the shoreline.

Coral Reefs and other Benthic Habitats

Mapped benthic habitats in the landing site area include pavement, rock/boulder, sand, and unknown (Figure 3.14-20). Table 3.14-11 identifies the acreages of these mapped habitats within the landing site area. Unknown is the most dominant cover type comprising 11,185 ac. Sand is the least dominant benthic habitat type comprising 295 ac. Pavement and rock and boulder predominate most of the benthic substrate at depth less than 100 ft. This is likely the result of strong wave action in the area (U of H 2012d).

Based on the findings of other studies in Hawai‘i, it is anticipated that below 100 ft in depth, the marine benthic community begins to change. The attenuation of sunlight reduces the presence of corals and other marine organisms that depend on sunlight. The benthic cover types begin to be dominated by rock, sediments, or detrital mats.

Surface Waters (Saline)

Marine waters in the landing site area are classified as AA by the State of Hawai‘i. The waters of landing site areas are not confined and receive a strong exchange with waters of the open ocean.

Protected Habitats

The waters of the landing site area are within the HIHWNMS. Refer to the text provided in the Maui-Kapalua landing site area for a description of this resource.

Coastal Zone Management – Special Management Area

In the landing site area, the entire shoreline is designated as County of Maui CZM-SMA. The SMA is depicted in Figure 3.14-21.

Essential Fish Habitat

Habitats adjacent to the Moloka‘i-Kaluakoi landing site area are likely to support shallow-water (0–50 fm) and deep-water bottomfish complexes in the egg, larvae, juvenile and adult life stages. Shallow-water and deep-water bottomfish complex HAPC locations include all slopes and escarpments between 20–140 fm. The landing site area habitat from the shoreline to 50 fm

is likely to support the egg, larvae, juvenile, and adult life stages of the spiny and slipper lobster complex and the kona crab.

The landing site area habitats are likely to support coral reef ecosystems, which include the water column and all benthic substrate to a depth of 50 fm from the shoreline to the outer limit of the EEZ. None of the six designated EFHs for deep-water precious corals, nor the three beds known for shallow-water precious corals, are located near this landing site area. Seamount groundfish would not be present adjacent to this landing site area, as it occurs between longitude 158°W and 156°W and latitude 20°N and 21°N, which is outside the seamount groundfish preferred habitat.

Threatened and Endangered Species

Terrestrial

The Hawaiian coot has been recorded in the designated critical habitat for waterbirds.

Coastal

There are no known turtle nesting sites in the landing site area.

The humpback whale would be expected in the waters off of this landing site area during the winter months for calving. Other whale species, if present, would likely only use the deeper water portions of the landing site area during migration.

There is no known occurrence of monk seals utilizing the beaches as haulout or pupping areas. However, the presence of sandy beaches and shallow water marine environments would not preclude monk seals from occasionally using the coastal resources of the landing site area. NMFS has proposed the waters around Molokaʻi to a depth of 500 m and the island's beaches as critical habitat for the monk seal. If accepted, the entire landing site area would be designated as critical habitat.

Newell's shearwater is known to nest on the island of Molokaʻi in high elevations and could potentially utilize the habitats of the landing site area.

<u>Molokaʻi–Kaunakakai (South Molokaʻi)</u>

The Molokaʻi-Kaunakakai landing site area is a roughly rectangular-shaped parcel located on the southern coast of Molokaʻi. Practically the entire landing site area is less than 25 ft in elevation, with much of the land area composed of tidal wetlands and mudflats. The extreme northwestern portion of the landing site area has steep slopes with elevations in excess of 300 ft.

Terrestrial and Wetlands

Habitats

Within the landing site area, 10 different habitats are identified (Figure 3.14-22). These habitats are alien forest, alien grassland, alien shrubs and grasses, kiawe forest and shrubland, koa haole shrubland, lantana shrubland, low-density developed, very sparse vegetation to unvegetated, water, and wetland vegetation. Table 3.14-12 identifies the acreages of habitat types within the landing site area. Kiawe forest and shrubland is the most dominant land cover type accounting for approximately 313 ac, just over one-quarter of the entire landing site area. At 7.6 ac (< 1 percent), alien grassland is the least dominant habitat.

Much of the landing site area is undeveloped. Wetland vegetation dominates the area adjacent to the coastline and portions of the eastern half of the landing site area around Palaau. The eastern portion contains pockets of shrublands and forests that are contiguous to sparsely vegetated and unvegetated areas, as well as open water. Farther west, koa haole shrubland characterizes the higher terrain and steeper slopes of the northwest quadrant of the landing site area. A mix of alien and native trees/shrubs, as well as emergent wetlands, dominates the low-lying southwest portion of the landing site area.

Wetlands

The NWI database has identified four different wetland classifications within the landing site area, depicted in Figure 3.14-23. These wetland classifications are estuarine and marine deepwater, estuarine and marine wetland, freshwater emergent, and freshwater forested/shrub. Table 3.14-13 highlights the relevant wetland types as well as the corresponding acreages. Covering more than 62 percent of the total area, wetlands account for the majority of the Molokaʻi Kuanakakai landing site area; freshwater emergent wetlands are the dominant wetland type, with over 422 ac of area.

Along the coast and within the low-lying central and eastern portions of the landing site areas, there is an extensive wetland complex. In the central portion of the landing site area, a small lagoon supports estuarine scrub/shrub and forested wetland cover types. In areas of higher elevation, palustrine emergent and forested wetlands that experience seasonal and/or semi-permanent flooding are present. Extensive areas of mangroves are located around Kaunakakai Harbor and the south coast of Molokaʻi (USGS 2012). Mangroves were originally brought to Hawaiʻi in 1902 as part of a shoreline stabilization program (U of H 2012e). Seaward of the estuarine wetlands, the marine wetlands are identified as subtidal marine wetlands with coral reefs.

Surface waters (Nonsaline)

In the landing site area, surface water resources consist of several fish ponds and nonperennial streams that flow through the landing site area. All water bodies in the landing site area are classified as Class II waters.

Protected Habitats

A designated critical habitat for waterbirds is located immediately east of the landing site area (Figure 3.14-24). The habitat is associated with fishponds and wetlands.

Coastal Resources

The south Molokaʻi landing site area includes a coastal marine environment with 18,550 linear ft of shoreline and 4,100 ac of marine habitat. Within 5,000 ft of the shoreline, depths are very shallow and are often less than 30 ft. The maximum depth at 10,000 ft from the shoreline is only 300 ft.

Coral Reefs and other Benthic Habitats

Mapped benthic habitats in the landing site area include aggregate reef, artificial, mud, pavement, pavement w/sand channels, scattered coral/rock, sand, spur and groove, and unknown (Figure 3.14-25). Table 3.14-14 identifies the acreages of these mapped habitats within the landing site area. Unknown is the most dominant cover type comprising 1,517 ac. Pavement with sand channels is the least dominant comprising 16.4 ac. Along the shoreline and within the lagoon area, the benthic habitat type is classified as mud. Farther seaward, the habitat type is classified as coral pavement and sand. At a depth of 30 ft, spur and groove and aggregate reef habitats dominate.

Based on the findings of other studies in Hawaiʻi, it is anticipated that below 100 ft in depth, the marine benthic community begins to change. The attenuation of sunlight reduces the presence of corals and other marine organisms that depend on sunlight. It is at this depth that the benthic cover types start becoming dominated by rock, sediments, or detrital mats.

Open Water (saline)

The waters of the landing site area are classified as Class A waters by the State of Hawaiʻi.

Protected Habitats

The HIHWNMS is located along the south coast of Molokaʻi. Refer to the text provided in the Maui-Kapalua landing site area for a description of this resource.

Coastal Zone Management – Special Management Area

Much of the landing site area, including the entire eastern half, is County of Maui-designated CZM-SMA. Figure 3.14-26 identifies this CZM-SMA in the landing site area.

Essential Fish Habitat

Habitats adjacent to the Molokaʻi-Kaunakakai landing site area are likely to support shallow-water (0–50 fm/0–100 m) and deep-water bottomfish complexes in the egg, larvae, juvenile, and adult life stages. Shallow-water and deep-water bottomfish complex HAPC locations include all slopes and escarpments between 20 and 140 fm. The landing site area habitat from the shoreline to 50 fm (100 m) is likely to support the egg, larvae, juvenile, and adult life stages of the spiny and slipper lobster complex and the kona crab.

The landing site area habitats are likely to support coral reef ecosystems, which include the water column and all benthic substrate to a depth of 50 fm (100 m) from the shoreline to the outer limit of the EEZ. None of the six designated EFHs for deep-water precious corals, nor the three beds known for shallow-water precious corals, are located near this landing site area.

Threatened and Endangered Species

Terrestrial

The Hawaiian coot and Hawaiian stilt have been recorded in the critical waterbird habitat immediately east of the landing site area. It is likely the species would also use the adjacent wetland habitats within the landing site area.

Coastal

There are no known turtle nesting sites in the landing site area.

The humpback whale would be expected in the waters off of this landing site area during the winter months for calving. Other whale species, if present, would likely only use the deeper water portions of the landing site area during migration.

There is no known occurrence of monk seals utilizing the beaches as haulout or pupping areas. However, the presence of sandy beaches and shallow water marine environments would not preclude monk seals from occasionally using the coastal resources of the landing site area. NMFS has proposed the waters around Molokaʻi to a depth of 500 m and the island's beaches as critical habitat for the monk seal. If accepted, the entire landing site area would be designated as critical habitat.

Newell's shearwater is known to nest on Molokaʻi in high elevations and could potentially utilize this area for foraging.

Oʻahu

This section identifies the natural resources at the MCBH at Kāneʻohe Bay and Pearl Harbor landing site areas on the island of Oʻahu.

Oʻahu–MCBH at Kāneʻohe Bay

Terrestrial and Wetlands Resources

The Oʻahu–MCBH at Kāneʻohe Bay landing site area is a crescent-shaped parcel that encompasses about 4,120 ac. The landing site area covers an area of the coastline from Mokapu Point in the north to Wilea Point in the south. Much of the central portion of the landing site area is less than 20 ft AMSL and includes the city of Kailua and MCBH at Kāneʻohe Bay. At either end of landing site area, in the areas of Mokapu Point and Wilea Point, there are hills with maximum elevations of 600+ and 560+ ft AMSL, respectively.

Habitats

Review of HI-GAP data identified 12 different habitats within the landing site area (Figure 3.14-27). These habitats are alien forest, alien grassland, alien shrubland, alien shrubs and grasses, high-density developed, kiawe forest and scrubland, kiawe-koa haole forest and shrubland, koa haole shrubland, low-density developed, very sparse vegetation to unvegetated, water, and wetland vegetation. Table 3.14-15 identifies the habitat types and corresponding acreages within the landing site area. At approximately 1,269 ac (44.67 percent), low-density development dominates all cover types within the landing site area. Wetland vegetation, totaling just under 6 ac, is the least dominant, accounting for less than 1 percent of the total area.

As indicated in Table 3.14-15, the predominance of developed habitats in the landing site area reflects the development associated with the city of Kailua and MCBH at Kāneʻohe Bay. These habitats are of lower ecological value and would be limited in the diversity and abundance of organisms they could support. Within the areas of higher elevations near Mokapu Point and Wilea Point, habitats of higher ecological value (e.g., vegetated shrub and grass habitats) are present (Figure 3.14-27). The undeveloped habitats of MCBH at Kāneʻohe Bay, especially near the coast, have been noted to be home to numerous wedge-tailed shearwaters (*Puffinus pacificus*). Aquatic habitats (inland waters) within the landing site area are limited to ponds, outlet canals, and a few intermittent streams in areas of higher elevation.

Wetlands

The four different wetland classifications within the landing site area are depicted in Figure 3.14-28. These wetland classifications are estuarine and marine deepwater, estuarine and marine wetland, freshwater forested/shrub wetland, and freshwater pond. Table 3.14-16 identifies the wetland types as well as the corresponding acreages. Estuarine and marine wetland is the most prevalent wetland type within the landing site area.

Freshwater wetlands in the landing site area account for 3.52 ac, or 1.86% of the total wetland area. Freshwater forested/shrub wetlands are mapped as palustrine, with scrub-shrub broad-leaved evergreen vegetation that is seasonally flooded. These wetlands occur in association with the few vegetated stream corridors in the higher elevations of Kaiwa Ridge, west of Wilea Point. One freshwater pond exists within the city limits of Kailua at the Lanikai School and is mapped as a palustrine unconsolidated bottom wetland that is permanently flooded and excavated. Estuarine emergent wetlands occur within the Kaiuapuhi and Nuʻupla Fish Ponds and the canals that connect these ponds with the ocean. In addition, west of the landing site area, there is a large freshwater emergent wetland named the Kawai Nui Marsh Wildlife Sanctuary where drainage canals from this marsh and the adjacent Kaʻelepulu Pond travel east and flow through the northern and southern portions of the city of Kailua. In the landing site areas, these canals are classified as estuarine emergent wetlands.

Surface Waters (Nonsaline)

Surface waters within the landing site areas consist of drainage canals, ponds associated with the Kaiuapuhi and Nuʻupla Fish Ponds, and intermittent streams in areas of higher elevation (Figure 3.14-28). The canals and ponds (and associated wetlands) are classified by the State of Hawaiʻi as Class 1 waters. All other water bodies in the landing site area are classified as Class II waters.

Large Contiguous and Protected Habitats

Within the landing site area, there are several protected habitats. The habitats are depicted in Figure 3.14-29 and are described below.

Nuʻupia Fish Ponds Complex Wildlife Management Area (includes Kaluapuhi Pond) – This group of eight fish ponds is associated with patches of tidal wetlands and shrubland, totaling 517 ac, and is located within MCBH at Kāneʻohe Bay (USACE 2002). Access to the site is limited due its occurrence on MCBH at Kāneʻohe Bay property. The site is used by the endangered Hawaiian coots, Hawaiian moorhen, and the Hawaiian short-eared owl (DoD 2008), and the Hawaiian duck and wedge-tailed shearwaters (MCBH 2012). The site is habitat for approximately 10 percent of the Hawaiian stilt population (MCBH 2012). Populations of the endangered shrub Koʻoloaʻula (*Abutilon menziesii*) have also been recorded (DoD 2008).

Kawai Nui Marsh – This large 830-ac emergent wetland complex is located west of Kailua. It is recognized as a wetland of international importance (Ramsar 2012) and is used by DLNR to manage both flooding for the nearby town of Kailua (USACE 2008; DLNR 2012) and water quality in Kailua Bay (USACE 2008). The Kailua Canal is connected to Kawai Nui Marsh and Kailua Bay. The marsh is habitat for a community of rare fishes, snails and birds. Four endangered waterbirds use Kawai Nui Marsh as habitat: Hawaiian duck, Hawaiian stilt, Hawaiian moorhen, and Hawaiian coot (USACE 2008).

Ulupo Heiau State Monument – Located adjacent to the Kawai Nui Marsh, this 8-acre park provides habitats for native species. As a state park, it is protected from development.

Ka‘elepulu Fish Pond & Wetland – Also called “Enchanted Lake,” it is an 80-acre fish pond less than a mile from Kawai Nui Marsh (Enchanted Lake Residents Association 2010). The associated terrestrial habitat is largely developed, but includes a 6-acre protected wetland that provides habitat for the endangered Hawaiian moorhen, Hawaiian coot, Hawaiian stilt, and Hawaiian duck, as well as migratory avian species (Ka‘elepulu Wetland 2010).

Coastal (Marine) Resources

Located on the north side of the island and partially within MCBH at Kāne‘ohe Bay, the coastal marine environment includes approximately 40,600 linear ft of shoreline and approximately 8,600 ac of marine habitat. Within the landing site area, water depths vary between 0 and 1,150 Below Sea Level (BSL) (Figure 3.14-30).

Coral Reefs other Benthic Habitats

An inventory of benthic habitats was collected and analyzed for the area extending from the shoreline outward 10,000 ft. Mapped benthic habitats include the following: aggregate reef, aggregated patch reef, individual patch reef, land (islets off shore), mud, pavement, pavement w/sand channels rock/boulder, sand, scattered coral/rock, spur and groove, and unknown (benthic habitats in water depths below 100 ft) (Figure 3.14-30).

Table 3.14-17 identifies the acreages of these mapped habitats within the landing site area. Pavement with sand channels is the most dominant cover type comprising almost 2,560 ac (30 percent). Mud is the least dominant comprising only 1.4 ac (< 1 percent).

Within much of the landing site area, pavement and sand communities occur along the shoreline at depths of less than 20 ft. In the northern half of the landing site area, benthic habitats that have more ecologically valuable and diverse coral communities (e.g., aggregated patch reefs, spur and groove) occur seaward of pavement and sand communities. In the southern portion of the landing site area south of the cable terminus, the benthic habitats with higher percentages of corals occur close to the shoreline. This area also contains part of a

marine bird sanctuary. The spotted seahorse, an International Union for Conservation of Nature (IUCN) listed endangered species, has been observed in Kāneʻohe Bay (West Hawaiʻi Today 2007; Froese and Pauly 2011a). The spotted seahorse is expected to utilize the seaward space adjacent to the landing landing site area for foraging and breeding.

Based on the findings of other studies in Hawaiʻi, it is anticipated that below 100 ft in depth, the marine benthic community begins to change. The attenuation of sunlight reduces the presence of corals and other marine organisms that depend on sunlight. It is at these depths that the benthic cover types begin to be dominated by rock, sediments, or detrital mats.

Surface Water Resources (Saline)

Kāneʻohe Bay is classified by the State of Hawaiʻi as a Class A water body. The bay is open to the sea and there is a strong exchange of water between the bay and the ocean. There are only a few streams that flow into the bay.

Protected Habitats

There are two seabird sanctuaries within and/or adjacent to the landing site area. The habitats identified below are presented in Figure 3.14-31.

Mokolea Seabird Sanctuary – Mokolea is a small, jagged volcanic islet 1 mile southeast of Mokapu Point. It is 0.4 ac in size with a maximum elevation of 15 ft. Despite waves washing over the top of this little island during severe storms, some seabirds are still able to use it for nesting. Small numbers of Bulwer's petrels (*Bulweria bulwerii*), brown noddies (*Anous stolidus*), and black noddies (*Anous minutus*) have been documented nesting on Mokolea (OIRC 2012a). Observations made in 1998 recorded 200 breeding adult noddies of both species. Mokolea may be one source of the black noddies frequently seen foraging in the brackish wetlands and nearshore waters of Mokapu Peninsula (OIRC 2012a).

Moku Lua Seabird Sanctuary – Mokulua is an offshore islet reserve, managed by Hawaiʻi DOFAW. The sanctuary is protected by Hawaiʻi Administrative Rules, Title 13 Chapter 125, and federal regulations (OIRC 2012b). Mokulua translates as "two islands" and is, indeed, made up of two volcanic islets; Moku Nui or North Mokulua and Moku Iki or South Mokulua. Together, they total 24 ac in size and reach elevations of 225 and 150 ft, respectively. They are located approximately 4,000 ft offshore from Lanikai. Wedge-tailed shearwaters and Bulwer's petrels nest on North and South Mokulua (OIRC 2012b). USFWS has designated Moku Lua as critical habitat for federally endangered ʻakoko (*Chamaesyce kuwaleana*), though the species does not currently exist in the sanctuary (OIRC 2012b). The rare, native yellow-faced bee (*Hylaeus hilaris*) is present on Mokulua (OIRC 2012b). Threatened green sea turtles (*Chelonia mydas*) are seen in the Mokulua waters (OIRC 2012b).

Essential Fish Habitat

The bathymetry and habitats present in the Oʻahu-MCBH at Kanohoe Bay landing site area and adjacent waters up to 300 ft (50 fm) deep are regulated under EFH. Habitats adjacent to Pearl Harbor landing site area are include a variety of EFH species and their life stages including the egg, larvae, juvenile, and adult life stages of the spiny and slipper lobster complex and the kona crab, bottomfish complexes, and coral reef complexes. None of the six designated EFHs for deep-water precious corals, nor the three beds known for shallow-water precious corals, are located near this landing site area.

Seamount groundfish would not be present adjacent to this landing site area, as the landing site area occurs between longitude 158°W and 156°W and latitude 20°N and 21°N, which is outside the seamount groundfish preferred habitat.

Coastal Zone Management – Special Managed Areas

The landing site area is designated by the County of Honolulu as CZM-SMA; it is identified in Figure 3.14-31.

<u>Threatened and Endangered Species</u>

Terrestrial

Within the landing site area, there are several known federal and state species that occur or have the potential to occur. Hawaiian coot, Hawaiian common moorhen, Hawaiian short-eared owl and Hawaiian stilts are known to utilize the mashes and fish ponds within and adjacent to the landing site area.

Oʻahu rollandia has been identified on the small islands off to the northeast and east of the landing site area.

Coastal

There are no known turtle nesting sites in the landing site area. Green and hawksbill turtles are known to nest in Hawaiʻi and forage in nearshore waters around Hawaiʻi. Loggerhead, leatherback, and olive ridley turtles have been sighted offshore by Hawaiʻi-based pelagic longline vessels as the turtles migrate through EEZ waters around the Hawaiʻi Archipelago (NMFS 2005).

The humpback whale would be expected in the waters off of this landing site area during the winter months for calving. The sperm whale has been observed off of MCBH at Kāneʻohe Bay along the shelf break and may occasionally transit through the deeper water portions of the

landing site area. Other whale species, if present, would likely only use the deeper water portions of the landing site area during migration.

Hawaiian monk seals have used this area as a haulout. Also, once in 1996, a birthing and pup rearing occurred in this area. NMFS has proposed the waters around O‘ahu to a depth of 500 m as critical habitat for the monk seal. Excluded from this listing of proposed critical habitat are military installations of MCBH at Kāne‘ohe Bay and Bellows Air Force Base; however, the rest of the landing site area would be within the proposed critical habitat.

O‘ahu–Pearl Harbor Landing Site Area

Terrestrial and Wetlands Resources

The O‘ahu–Pearl Harbor landing site area is a crescent-shaped parcel that encompasses about 6,040 ac of land. The landing site area includes downtown Honolulu, Honolulu International Airport, and a portion of land located west of the entrance to Pearl Harbor. Almost the entire landing site area is less than 10 ft in elevation. A couple of higher points in the airport and Honolulu are in excess of 20 to 30 ft. Just north of the landing site area and Honolulu, steep slopes are encountered.

Habitats

Within the landing site area 13 different habitats are identified (Figure 3.14-32). These habitats are alien forest, alien grassland, alien shrubs and grasses, alien trees and shrubs, closed kukui forest, fountain grass/buffel grass grassland, high-density developed, kiawe forest and shrubland, kiawe-koa haole forest and shrubland, koa haole shrubland, low-density developed, very sparse vegetation to unvegetated, and water. Table 3.14-18 identifies the habitat types and corresponding acreages within the landing site area. High-density developed habitat in the O‘ahu-Pearl Harbor landing site area total 3,078 ac (50.94 percent), making it the most dominant cover type. The least dominant cover type is fountain grass/buffel grass grassland at 1.56 ac (< 1 percent).

As indicated in Table 3.14-18, the predominance of developed habitats is reflective of the development associated with city of Honolulu and military installations, accounting for over 70 percent of the area cover types in the landing site area. These habitats are of lower ecological value and would be limited in the diversity and abundance of organisms they could support. The parcel of land west of the entrance to Pearl Harbor is less developed and home to native vegetated habitats such as the Kiawe forest and shrubland. Although native species are present, large populations of alien grasses and shrubs exist in both parcels, particularly in the areas situated between impervious areas of the airport. Aquatic habitats are limited in the landing site area and are composed of a few ponds and small perennial and ephemeral streams. These areas are discussed in greater detail in the following section.

Wetlands

Five different wetland classifications are within the landing site area, which are depicted in Figure 3.14-33. These wetland classifications are estuarine and marine deepwater, estuarine and marine wetland, freshwater forested/shrub wetland, freshwater pond, and riverine. Table 3.14-19 highlights the relevant wetland types as well as the corresponding acreages. The majority of total landing site area wetlands are estuarine and marine classifications, which account for nearly 83 percent of all wetland types.

Freshwater wetlands are very limited in the landing site area as a result of the highly developed character of the landing site area. Freshwater wetlands consist of riverine lower perennial wetlands with an unconsolidated bottom, which are likely associated with drainage/runoff from the nearby Honolulu Airport. In addition, within the airport is a small quarter-acre area of scrub/forested wetlands, associated with a drainage way.

In the landing site area, estuarine emergent wetlands are located within Keehi Lagoon/Honolulu Harbor in between the dredged canal areas and sporadically along the shoreline. In the center of the lagoon, a large marine intertidal wetland complex is mapped as containing unconsolidated shores (i.e., bars and flats), aquatic beds and scrub/shrub vegetation. A large wetland complex is located south of the runway and is classified by the NWI as a marine intertidal coral reef. Within the entrance of Honolulu Harbor, a large estuarine, intertidal, scrub/shrub wetland is located. The western landing site area of Pearl Harbor contains freshwater ponds, classified as palustrine unconsolidated bottom wetlands that are permanently flooded and likely artificially excavated, consistent with the highly developed nature of the area.

Surface waters (Nonsaline)

West of the entrance to Pearl Harbor, several small ponds (Figure 3.14-34) are located within the landing site area. Perennial and nonperennial streams are located in the landing site area, some of which appear to be associated with the drainage systems of Pearl Harbor. The limited freshwater resources in the landing site areas are classified as Class II waters.

Coastal Resources

The coastal marine environment analyzed as part of the O‘ahu-Pearl Harbor landing site area includes approximately 40,594 linear ft of shoreline and 15,447 ac of marine habitat. Within the landing site area, water depths vary between 0 and 1,150 BSL. In the eastern portion of the landing site area, the 100 ft depth contour occurs on a short distance from shore and the maximum depth is over 1,200 ft.

Coral Reefs and Other Benthic Habitats

An inventory of benthic habitats was mapped for the area extending from the shoreline outward 10,000 ft. Per the GIS data, mapped benthic habitats include the following: aggregate reef, artificial, land, mud, pavement, rubble, sand, spur and groove, and unknown (Figure 3.14-35). Table 3.14-20 identifies the acreages of these mapped habitats within the landing site area. Pavement is the most dominant cover type comprising 5,411.7 ac (35 percent). Aggregate reef is the least dominant comprising 1.5 ac (< 1 percent). Near the shore, a flat shelf dominated by coral pavement and sand extends seaward to a depth of about 30-50 ft. At these depths, the slope becomes steeper, and spur and grove coral formations are present. Within the dredged channels entering Pearl Harbor and Honolulu, the benthic substrate is composed of mud. In Honolulu Harbor, the dredged channels form a shallow, triangular parcel that is home to coral reefs (Figure 3.14-35).

Below 100 ft in depth, the marine benthic community begins to change. The attenuation of sunlight reduces the presence of corals and other marine organisms that depend on sunlight.

In the marine habitat south of the Honolulu Airport, a baseline survey of benthic biota was performed in conjunction with another project. The survey data were collected with a remotely operated vehicle. The findings of this study indicated that the deepest live coral colony observed was at a depth of 165 ft. Corals were rare at depths in excess of 120 ft. These colonies in excess of 120 ft were generally small; their presence at these depths possibly resulting from storm wave deposition (Brewer 2001).

In depths from 170 and 260 ft, benthic fauna include an unidentified tube-dwelling, mound-building, nocturnal terebellid (family Terebellidae) polychaete worm that dominate the infauna with densities ranging from an estimated one to three per square meter. Irregular to sometimes linear tracks were occasionally observed on the substrate at water depths between 170 and 260 ft. These tracks, which disturb the substrate surface layer, may result from gastropod (snail) foraging or the movement or grazing activities of other benthic invertebrates (Brewer 2001).

No discernible benthic or epibenthic macrofauna or infauna were observed at depths between 260 ft and 300 ft. The benthic sediments at deeper water depths, greater than 250 ft, are often composed of mats of living and dead diatoms, zooplankton, phytoplankton, organic detritus, and heterotrophic bacteria.

Surface Waters (saline)

The landing site area is open to the sea and there is a strong aquatic exchange of water between waters of the landing site area and the ocean. Even so, Honolulu Harbor is somewhat enclosed and may have slightly lower water quality. Several streams flow into both Honolulu

Harbor and Pearl Harbor. The waters of the landing site area are classified by the State of Hawai‘i as a Class A water body.

Protected Habitats

Two critical habitats for water birds exist within the vicinity of the landing site area (Figure 3.14-36). One habitat is located approximately 3,000 ft north of the eastern section of the landing site area, whereas the other is located southeast of Honolulu International Airport, within Honolulu Harbor. The Pouhula Marsh Wildlife Sanctuary is located approximately 3 miles north of the mouth of Pearl Harbor on the northwestern shoreline of the West Loch. Units of the Pearl Harbor National Wildlife Refuge (PHNWR) are located approximately 2 miles north of the landing site area.

Sand Island State Recreation Area is a 14-ac park located on the southern and western shoreline of Sand Island. As a state park, the area is afforded some regulatory protection from pollution and development.

Essential Fish Habitat

The bathymetry and habitats present in the O‘ahu–Pearl Harbor landing site area up to 300 ft (50 fm) are regulated under EFH. Habitats adjacent to Pearl Harbor landing site area likely support a variety of EFH species and their life stages including the egg, larvae, juvenile, and adult life stages of the spiny and slipper lobster complex and the kona crab, bottomfish complexes, and coral reef complexes. None of the six designated EFHs for deep-water precious corals, nor the three beds known for shallow-water precious corals, are located near this landing site area.

Coastal Zone Management – Special Managed Areas

Areas designated by the county of Honolulu as CZM-SMA are identified in Figure 3.14-36. In the landing site area, the entire waterfront is designated as CZM-SMA.

Threatened and Endangered Species

Terrestrial

The Hawaiian duck has been observed in the Honouliuli and Waiawa Units of the PHNWR and at the mouth of streams that flow into Pearl Harbor (NAVFAC PAC 2006). The Hawaiian coot, Hawaiian moorhen, and Hawaiian stilt are known to utilize these areas.

Short-eared owl was observed near Puuloa Training Facility (MCBH INRMP, update, 2011). This training facility occurs within the landing site area.

Coastal

There are no known turtle nesting sites in the landing site area. Green and hawksbill turtles are known to nest in Hawai‘i and forage in nearshore waters around Hawai‘i. Green turtles have been observed adjacent to (seaward of) the Puuloa Training Facility. Also, the threatened green sea turtle (*Chelonia mydas*) is commonly sighted within the Pearl Harbor Entrance Channel and occasionally sighted within Pearl Harbor. Only one other protected sea turtle species has been recorded within Pearl Harbor or the entrance channel: the endangered hawksbill sea turtle (*Eretmochelys imbricata*) (Smith et al. 2006), Loggerhead, leatherback, and olive ridley sea turtles have been sighted offshore by Hawai‘i-based pelagic longline vessels as they migrate through EEZ waters around the Hawai‘i Archipelago (NMFS 2005).

The humpback whale would be expected in the waters off of this landing site area during the winter months for calving. Other whale species, if present, would likely only use the deeper water portions of the landing site area during migration. The Pearl Harbor Master reported the presence of an adult humpback and a calf in East Loch on March 21, 1998. The whale sighting is considered to be an extraordinarily unusual event (Smith et al. 2006).

NMFS has proposed the waters around O‘ahu to a depth of 500 m as critical habitat for the monk seal. Honolulu Harbor and the western half of the landing site area are not currently being considered for inclusion as critical habitat. West of the entrance of Pearl Harbor, the beach in the landing site area has been used as a haulout area for monk seals. The area, which is not a military property, is now under consideration by NMFS to be listed as critical habitat for the seals.

3.14.5 Potential Impacts of Cable System Implementation

Impact Criteria

For each of the seven landing site areas, impacts would be considered to include the removal or disturbance of habitat during construction and/or operation of the converter station and the other activities associated with a cable system implementation. For species, including threatened and endangered species, the removed or disturbed habitat will be evaluated as to whether it serves a critical role in the species life cycle (e.g., breeding nesting, feeding, etc.) or whether the removal of the habitat would serve as a barrier to biological requirements of the species.

General Description of Impact Types

Potential impacts related to building the converter stations and placement and drilling of the cable are categorized as follows:

- Construction – Impacts that occur during the building of the converter stations and placement of the cable. Construction-related impacts are often short term; however, the effect of the impact could be long lasting. Construction-related impacts include habitat damage, sediment resuspension and deposition, hydroacoustics, ship strike, and anchor damage.
- Operational – Impacts related to the operation of the stations and the cable.

Potential construction and operational impacts to both terrestrial and coastal resources are discussed below for the landing sites:

General

Terrestrial Resources

Construction Impacts

HABITAT DAMAGE

If the build footprint occurs in an undeveloped parcel, existing habitats would be permanently damaged. Impacts to biological resources could be caused by:

- Clearance and/or disturbance by construction and construction equipment resulting in terrestrial vegetation removal
- Shading of adjacent habitats
- Wildlife disturbance from construction noise
- Air pollution
- Artificial lighting that could disrupt wildlife

The conversion of natural areas to man-made development would result in the permanent net loss of ecological resources within the development footprint.

SEDIMENT RESUSPENSION AND DEPOSITION

Construction in terrestrial areas could lead to the erosion and transport of soil by wind or rain to nearby water bodies and wetlands. The sedimentation and ultimate deposition could result in impacts to these environments through burial of habitats and lowering of water quality. In addition, disturbance of site soils may release potential chemical contaminants present in soil due to historical releases. Hawai‘i’s freshwater fish species are highly specialized, and increased sedimentation and burial of benthic habitats could result in impacts to these species.

ACOUSTIC

During construction, noise generated by vehicles and machines would result in a short-term perturbation of wildlife species not adapted to urban environments.

CONTAMINATED SOILS – POTENTIAL ECOLOGICAL STRESSORS

Due to the level of development within the landing site areas, soils and sediments may contain chemical contamination. Disturbance of these soils may introduce chemical contaminants into the environment. The sections below identify the potential sources of contamination in and/or near the landing site areas.

Chemicals present in terrestrial soil and marine sediments are likely the result of point source releases of chemicals due do to accidental spills (e.g., oil pipelines or storage facilities, electrical transformers), and/or past disposal practices. However, chemicals may also be transported to and from cable corridors and converter sites from adjacent urbanized areas (e.g., highways and streets) through natural and man-made transport pathways (e.g., urban runoff, airborne particulates, groundwater intrusion). Urbanized areas can be characterized as thousands of small point sources that may generate a broad range of chemicals that collect on lands and streets and adjacent areas. Localized activities that can be point sources of chemicals (e.g., agricultural activities, power-generating facilities, landfills) may be present in the landing site areas.

Once introduced into terrestrial soil, chemicals are subject to natural and man-made processes. Consequently, some persistent chemicals (e.g., PCBs, chlorinated pesticides [DDT, chlordane]) may remain in the soil for years or decades while other chemicals may gradually degrade with time. The diversity of point and nonpoint source contributions to a landing site area may result in a complex mixture of chemicals in the soil from both present-day and past or historical activities as well as natural contributions of metals from volcanic soils that frequently have elevated concentrations of some metals.

Operational Impacts

HABITAT FRAGMENTATION

The bifurcation of a habitat lowers the ecological value of the habitat. With respect to interconnected habitat complexes, the impacts to one habitat may result in impacts to adjacent habitats through the altering of wildlife travel corridors, changes in hydrology, etc. The construction of a converter station may result in disruption to wildlife movement and/or vegetation communities.

ELECTROMAGNETISM

Transmission cables between the cable landing site area and converter station may generate the potential for impacts to terrestrial organisms. For example, raising the temperature of terrestrial soil may potentially affect plants, soil invertebrates, and the higher level trophic birds and mammals that forage on these organisms, particularly plants and ground-dwelling and/or feeding birds.

Coastal Resources

It is envisioned that from the 100 ft depth contour to a location above the high tide line, the cable would be installed by HDD. The HDD cable, if placed sufficiently below a coral reef or other benthic habitat, should not compromise the structural integrity of corals, coral reef, or other benthic communities in water depths less than 100 ft.

The “connection point” location (i.e., areas where the cable exits the sea bed) would impact the benthic resources within an approximate 10-ft diameter area. From the 100 ft depth contour seaward, the cable would lay on the bottom, which could result in dislodgement, fragmentation, and injury/death to coral and other sessile marine organisms. Also, the periodic shifting from currents or storm events after installation may further damage marine organisms.

Construction Impacts

SEDIMENT RESUSPENSION AND DEPOSITION

The resuspension of sediment poses threats to a variety of marine organisms. Long-term and/or acute increases in sedimentation could alter migratory patterns, affect foraging ability, or even result in mortality of organisms through burial. Coral reefs and hard bottom communities may be negatively impacted, if the sedimentation is in excess of natural processes. Impacts from sedimentation and deposition may result in burial of the sessile organisms, attenuation of sunlight penetration reducing photosynthetic activity, and covering of hard substrates thereby reducing recruitment of corals and other sessile organisms.

HYDROACOUSTIC

The generation of underwater noise can impact marine species. The impacts can range from minor behavioral disruptions to mortality. It is anticipated that construction-generated noise would not occur at a level high enough to cause injury or mortality to marine fauna; however, generated noises could result in behavioral impacts to marine species.

CONTAMINATED SEDIMENTS – POTENTIAL ECOLOGICAL STRESSORS

Once introduced into the harbor, wetlands, or open coast nearshore habitats, chemicals may be deposited into and accumulate in sediments. As a result, sediment in harbors, wetlands, and open coastal nearshore subtidal habitats act as a natural trap or sink for chemicals from diverse sources that may have been released over a period of years or decades. The diversity of point and nonpoint sources results in a complex mixture of chemicals in the sediment and reflects contributions from both present-day and past or historical activities as well as natural contributions of metals from volcanic soils.

In addition to acting as a natural trap for chemicals, sediments are the natural habitat for many types of marine life, including, plants (e.g., algae, sea grasses), invertebrates (e.g., crabs), and fish, that are part of the food web for many shorebirds, waterbirds, mammals, and humans that consume algae, crabs, and fish.

DIRECTIONAL DRILLING

The term hydrofracture, also known as a “frac-out,” refers to an accident during HDD when drilling fluid leaks into a patch of unconsolidated sediments or a fault or crack in the geology above a boring and breaks out at the surface. Typical HDD lubricant consists of water mixed with bentonite clay. Certain forms of bentonite are highly expansive with a pH higher than sea water. If hydrofracture occurs during drilling, coral reefs and other marine habitats in the vicinity of the hydrofracture could be smothered and the increased turbidity could potentially alter the local water quality.

CABLE PLACEMENT IN OPEN WATER

During cable installation, the cable will extend from the sea floor to cable-laying ship. The presence of an approximately 4-10-inch-diameter cable would not pose a significant risk or obstacle for fish movement. Sea turtles and marine mammals do risk coming into contact with the cable. However, given the thin diameter of the cable and sheer size of the coastal ocean, contact between sea turtles and marine mammals and the cable is anticipated to be minimal, if at all. Current marine surveyed areas occur in the open ocean and/or in nonconfined coastal waters, which would permit the marine organisms to transit around the cable.

Operational – Related Impacts

HABITAT FRAGMENTATION

Given the complex habitats on the seafloor, especially corals and coral reefs, the addition of an approximately 4-10-inch-diameter cable is not likely to cause a significant impact to marine organisms if appropriate avoidance measures are used.

ELECTROMAGNETISM

The potential adverse effects to marine life generated by undersea power transmission cables is primarily caused by electromagnetic fields (EMFs) from the proposed electrical cables that increase the potential exposure for marine habitats and fauna. Transmission cables between the cable landing site area and converter site may also generate potential EMF impacts to coastal wetlands, freshwater streams, and terrestrial wildlife.

In addition to EMFs, the loss of energy from power transmission cables in the form of heat is expected to raise the temperature of the seafloor in the vicinity of the cable potentially affecting benthic species and biological processes (OSPAR 2009). Similarly, raising the temperature of terrestrial soil may potentially affect plants, soil invertebrates, and the higher level trophic birds and mammals that forage on these organisms, particularly plants and ground-dwelling and/or feeding birds.

Based on a study by Normandeau Associates, Inc. (2001), the effects of EMFs on marine organisms are identified in Table 3.14-21:

- On a qualitative basis, the weight of the evidence available suggests that elasmobranchs and sea turtles have the highest likelihood of being affected by exposure to power cable EMFs. Electrosensitivity is widely spread among elasmobranchs (fish) and magnetosensitivity is common among sea turtles. The ramifications of exposure of sea turtles at a critical life stage, such as adults and hatchlings traversing shallow waters at natal beaches, could seriously disrupt nesting behavior.
- Marine mammals have a relatively low likelihood of being affected by power cable EMFs despite being magnetosensitive because their high mobility would limit the duration of exposure.
- Populations of some species of decapod crustaceans (e.g., lobsters, crabs) could experience a moderate level of effects from EMFs as their epibenthic habitat and relatively low mobility would expose individual organisms to the highest field strengths.
- Although electro- or magnetosensitivity have been demonstrated in a number of pelagic fish species (non-elasmobranchs), this habitat preference generally places them outside the greatest field strengths from undersea cables. Demonstration of electro- or magnetosensitivity in demersal fish (other than elasmobranchs) is extremely limited and provides no basis for inferring a level of impact although these species have the potential to be exposed to the highest field strengths.

While Normandeau Associates, Inc. (2001) acknowledged the potential sensitivity of coral to EMFs, no information was presented in the document. Therefore, while little actual information appears to be available, coral reefs are expected to be exposed to adverse effects from EMFs because their epibenthic habitat and nonmobile life style would expose individual organisms and

the reef as a whole to EMFs of unknown field strengths. Because coral reefs provide habitats for many other species, their importance to the ecosystem is significant.

Specific Landing Site Areas

For all landing site areas, there is limited, if any, information regarding the marine benthic habitat below 100 ft. This data gap would need to be addressed through site-specific study. Thus, until accurate data can be gathered for each site, the potential impacts to benthic habitats below 100 ft include:

- Habitat removal at “connection point” locations, and vessel and anchor damage.
- Potential for increases in sedimentation and burial during construction.
- EMF effects upon fauna along cable route. It is also assumed that for all coral reefs and coral habitats in waters less than 100 ft, the contactor would be able to directional drill under these habitats.

Table 3.14-22 identifies the resources and summarizes potential impacts for each landing site area. Until the design characteristics and plans for the cable system is more clearly defined, potential impacts are generally identified in qualitative terms. Impacts to EFHs may be considered as a combination of impacts to benthic habitats and the open water column.

Terrestrial Resources

The potential impacts to terrestrial resources for each landing site area are identical to the potential impacts identified under general impact discussion above.

Coastal Resources

The potential impacts to coastal resources for each landing site area are identical to the potential impacts identified under general impact discussion above.

3.14.6 Conservation and Construction Measures

CCMs are identified for both the construction and operation of the cable and converter stations. These CCMs are discussed within the context of each resource. CCMs may include recommendations for the timing of work based on seasonal presence or absence, migratory routes, or use of engineering controls (e.g., noise attenuating devices, etc.). CCMs also identify studies that should occur to determine conclusively if a resource occurs within the footprint.

General Level Special Conservation and Construction Measures

Terrestrial

Sediment Erosion Control

CCMs for sediment erosion control and turbidity discharges should be accomplished by using staked hay bales; staked filter cloth; sodding, seeding, and mulching; staged construction; and/or the installation of turbidity screens around the immediate landing site area and any areas where soil disturbance will occur. Consideration should be given to performing construction activities during the dry season.

Flora and Fauna – Species Inventory and Seasonal Constraints

Vegetation

Prior to any vegetation impacts and/or soil disturbance activities, the construction footprint (i.e., all permanently and temporarily disturbed areas as a result of the construction) and immediately adjacent areas should be surveyed to determine if threatened and endangered plants or vegetation or habitats used by protected fauna are within or adjacent to the site. If present, construction plans should be evaluated to minimize impacts to the vegetation.

Threatened and Endangered Species

Alternative landing site areas should be investigated for presence of threatened and endangered species and their habitat. Impacts to habitats for threatened or endangered species should be avoided.

Habitats – Construction and Operational Constraints

Wetlands

The alternative landing site areas should be investigated for the presence of wetlands, if present, and impacts to wetlands should be avoided. If wetland impacts are unavoidable, the disturbance footprint should be minimized to greatest extent practicable. If a wetland must be impacted, do not bifurcate habitat. Appropriate wetland mitigation should be provided to compensate for the loss of wetland functions and values.

Surface Waters

Dredging and the placement of fill in open waters waters or altering drainage courses should be avoided. It is advisable that appropriate sediment erosion control plans be considered and adhered to during construction.

Upland Terrestrial Habitats

To minimize ecological impacts, consideration should be given to utilization of landing site areas in developed areas or locations where the vegetation has been disturbed.

Coastal

Horizontal Directional Drilling and Frac Outs

During the cable installation, any slack cable should be secured so cables do not sweep across the bottom. Also, vessel and barge anchorages should be considered over locations where live bottom habitat does not occur.

To minimize the possibility of a bentonite release, the volume of bentonite in the drill string and the drill pressure should be monitored at all times during the HDD operation. Also, use of seawater should be considered, in place of bentonite, as a drilling lubricant near the end of drilling operation.

Flora and Fauna – Species Inventory and Seasonal Constraints

Corals

In Hawaiʻi, some corals spawn year-round. However, many species spawn in the summer months, usually during or within 1 week of a new moon. Activities that may cause sedimentation and deposition or affect the surface of benthic habitats less than 200 ft in depth should be avoided, especially in the warmer months of the year.

Cable routes should be selected that minimize impacts to reef systems. Also, after the cable has been laid, divers should adjust cables to free pinned soft corals and limit the abrading of hard corals. Any corals that were dislodged should be reattached to suitable substrate.

Marine Mammals

In Hawaiian waters, humpback whales increase in number as their breeding season progresses from December through their peak in mid-February and March. Conversely, in April, as the species begins to migrate northward, their numbers decline in Hawaiian waters. As such,

appropriate consideration should be given to limiting offshore cable-laying activities during the time period from December through April.

Monk seal haulout areas that have been used in the past or could be used in the future should be avoided. Also, prior to construction activities, an area should be investigated for pupping activities. If pupping occurs within proximity to construction, consideration should be given to altering the time of year when disturbance would occur.

Sea Turtles

In potential sea turtle nesting beaches, no construction, operation, transportation, or storage of material/equipment should occur seaward of the existing dune crest during the marine turtle nesting season (April through October). No temporary lighting of the construction area visible from any part of the beach should be conducted at any time during marine turtle nesting season.

Coastal Threatened and Endangered Species

Boats should have lookouts to lessen chance of marine mammal strike, especially October through March. Sites should be investigated for presence of sea turtle nesting and monk seal haulout and pupping areas. If present, areas should be avoided. The beaches west of the entrance to Pearl Harbor are utilized by monk seals; surface disturbance to areas frequented by monk seals should be avoided.

Habitats – Construction and Operational Constraints

Benthic Habitats

Where possible, directional drilling under a protected biological resource should be considered. For all sites, benthic habitats below 100 ft should be investigated for the presence of corals and other fauna. Consideration for cable route selection should be given to the location with least coral coverage.

Open Water Column

Work should be accomplished to limit the amount of sediment resuspension to the greatest extent possible. Contractors should utilize work procedures that limit foreign materials and fluids from entering the marine habitat.

Location-Specific Description of CCM Recommendations based on Unique Characteristics

For each of the seven landing site areas, suggested CCMs for terrestrial and coastal resources are provided. For descriptions of general CCMs identified in the following tables, refer to the CCMs described in the previous section.

Maui

This section identifies the suggested terrestrial and coastal resource CCMs for the landing site areas on the island of Maui.

Maui-Kahului Harbor

Terrestrial Resources

The site-specific CCM recommendations for terrestrial resources within the Maui-Kahului Harbor landing site area are identified in Table 3.14-23.

Coastal Resources

The site-specific CCM recommendations for coastal resources of the Maui-Kahului Harbor landing site area are identified in Table 3.14-24.

Maui-Kapalua (West Maui)

Terrestrial Resources

The site-specific CCM recommendations for terrestrial resources within the Maui-Kapalua landing site area are identified in Table 3.14-25.

Coastal Resources

The site-specific CCM recommendations for coastal resources of the Maui-Kapalua landing site area are identified in Table 3.14-26.

Lānaʻi Landing Site Area

This section identifies the suggested terrestrial and coastal resource CCMs for Lānaʻi.

Terrestrial Resources

The site-specific CCM recommendations for terrestrial resources within the Lānaʻi landing site area are identified in Table 3.14-27.

Coastal Resources

The site-specific CCM recommendations for coastal resources within the Lānaʻi landing site area are identified in Table 3.14-28.

Molokaʻi

This section identifies the suggested terrestrial and coastal resource CCMs for the landing site areas on the island of Molokaʻi.

Molokaʻi-Kaluakoi (West Molokaʻi)

Terrestrial Resources

The site-specific CCM recommendations for terrestrial resources within the Molokaʻi-Kaluakoi landing site area are identified in Table 3.14-31.

Coastal Resources

The site-specific CCM recommendations for coastal resources within the Molokaʻi-Kaluakoi landing site area are identified in Table 3.14-32.

Molokaʻi-Kaunakakai (South Molokaʻi)

Terrestrial Resources

The site-specific CCM recommendations for terrestrial resources within the Molokaʻi-Kaunakakai landing site area are identified in Table 3.14-29.

Coastal Resources

The site-specific CCM recommendations for coastal resources within the Molokaʻi-Kaunakakai landing site area are identified in Table 3.14-30.

Oʻahu

This section identifies the suggested CCMs for the landing site areas on the island of Oʻahu.

Oʻahu-MCBH at Kāneʻohe Bay

Terrestrial Resources

The site-specific CCM recommendations for terrestrial resources within the MCBH at Kāneʻohe Bay landing site area are identified in Table 3.14-33.

Coastal Resources

The site-specific CCM recommendations for coastal resources of the MCBH at Kāneʻohe Bay landing site area are identified in Table 3.14-34.

Oʻahu-Pearl Harbor

Terrestrial Resources

The site-specific CCM recommendations for terrestrial resources within the Oʻahu-Pearl Harbor landing site area are identified in Table 3.14-35.

Coastal Resources

The site-specific CCM recommendations for coastal resources within the Oʻahu-Pearl Harbor landing site area are identified in Table 3.14-36.

<u>Data Gap Investigations for Selection of the Preferred Build Footprint</u>

The bulleted items below identify data gaps that would need to be addressed in order to evaluate impacts of the cable system implementation.

- Development Impact Studies – These studies would include: confirmation of previously mapped habitats, wetland delineations, habitat assessments, and threatened and endangered species investigations.
- Horizontal Directional Drilling – Identification of the depth of drill route and potential disruption of benthic resources. Also, identification of drill routes and connection points.
- Marine Resources – Below 100 ft in depth, there is little available data regarding the occurrence of biological resources; these areas would need to be investigated.

Table 3.14-1. GAP Analysis Cover Types Identified within the Terrestrial Portion of the Seven Landing Site Areas

GAP Cover type	Description
Active Agriculture	Lands under cultivation (e.g., bare soil, fallow land, row crops, orchards, etc.).
Alien Forest	Forest parcels dominated by alien species.
Alien Grassland	The most common statewide class is Alien Grassland, which occupies almost 12% of the state area. Alien grasses include fountain grass, buffel grass, and kikuyu.
Alien Shrubs and Grasses	This cover type identifies parcels dominated by both alien shrubs (e.g., Christmas berry, guava, etc.) and grasses.
Alien Trees and Shrubs	This cover type identifies parcels dominated with alien trees (e.g., Lantana) and shrubs.
Closed Kukui Forest	Deciduous forested parcel with at least 60% forested coverage, dominated by the Kukui tree (*Aleurites moluccana*).
Fountain Grass/Grass Grassland	A grassland dominated by introduced species of fountain grass and buffel grass.
High-Density Developed	Urban habitat characterized by limited vegetated areas.
Kiawe Forest and Shrubland	Forest dominated by kiawe (*Prosopis pallid*), a nonnative species.
Kiawe-Koa Haole Forest and Shrubland	Forest and shrubland dominated by native and nonnative species.
Kikuyu Grass Grassland/Pasture	A parcel dominated by the nonnative species of Kikuyu and parcel that are used for pastureland.
Koa Haole Shrubland	Shrubland parcel dominated with native species Koa (*Acacia koa*).
Lantana Shrubland	Shrubland dominated by Lantana, a nonnative species.
Low-Density Developed	Anthropogenic developed areas of a suburban character.
Mixed Lantana and Christmas Berry Shrubland	Shrubland dominated by nonnative species of Lantana and Christmas berry.
Uncharacterized Open-Sparse Vegetation	Areas of very limited vegetation (e.g., pioneer vegetation on a lava flow).
Very Sparse Vegetation to Unvegetated	Areas of little vegetation (e.g., beaches, disturbed areas, etc.).
Water	Open water areas (e.g., fish ponds, streams, etc.).
Wetland Vegetation	Areas dominated by hydrophytic emergent, shrub, or forest species.

Table 3.14-2. Terrestrial and Coastal Species Threatened and Endangered Species

Animal	Species	Scientific Name	Federal Listing*	State Listing**
Terrestrial Species				
Birds – Waterbirds	Hawaiian duck	*Anas wyvilliana*	E	E
	Hawaiian coot	*Fulica alai*	E	E
	Hawaiian common moorhen	*Gallinoula chloropus sandvicensis*	E	E
	Hawaiian stilt	*Himantopus mexicanus knudseni*	E	E
Birds – Raptors	Hawaiian short-eared owl	*Asio flammeus sandwichensis*	–	E
Insect	Blackburn's sphinx moth	*Manduca blackburni*	E	E
Mammal	Hoary bat	*Lasiurus cinereus semotus*	E	E
Plants	Round-leaved chaff-flower	*Achyranthes splendens* var. *rotundata*	E	E
	Pu'uka'a	*Cyperus trachysanthos*	E	E
	O'ahu rollandia	*Cyanea humboldtiana*	E	E
	Native white hibiscus	*Hibiscus arnottianus*	E	E
	Native yellow hibiscus	*Hibiscus brackenridgei*	E	E
	Loulu palm	*Prichardia* spp.	–	E
	Ohai	*Sesbania tomentosa*	E	E
	Caper	*Capparis sandwichiana*	–	SOC
	Dwarf naupaka	*Scaevola coriacea*	E	E
	Native red hibiscus	*Hibiscus kokio*	–	SOC
	Ko'oloa'ula	*Abutilon menziesii*	E	SOC
Coastal Species				
Marine Mammals	Humpback whale	*Megaptera novaeangliae*	E	E
	Sperm whale	*Physeter macrocephalus*	E	E
	Blue whale	*Balaenoptera musculus*	E	–
	Fin whale	*Balaenoptera.physalus*	E	E
	Sei whale	*Balaenoptera.borealis*.	E	–
	Right whale	*Eubalaena japonica*	E	–
	Hawaiian monk seal	*Monachus schauinslandi*,	E	E
Sea birds	Short-tailed albatross	*Phoebastria immutabilis*	E	E
	Newell's shearwater	*Puffinus auricularis newelli*	T	T
Sea Turtles	Loggerhead sea turtle	*Caretta caretta*	T	T
	Green sea turtle	*Chelonia mydas*	T	T
	Leatherback sea turtle	*Dermochelys coriacea*	E	E
	Hawksbill sea turtle	*Eretmochelys imbricata*	E	E
	Olive ridley sea turtle	*Lepidochelys olivacea*	E	E

Note: E = Endangered, T = Threatened, SOC = Species of Concern, – = Not Listed
Sources: *USFWS 2012, NMFS 2012; **DOFAW 1996, DOFAW 2012, Mitchell et al. 2005

Table 3.14-3. Maui-Kahului Harbor Landing Site Area – Acreage of Terrestrial Habitat Type

Habitat	Acreage	Habitat	Acreage
Low-Density Developed	711	Very Sparse Vegetation to Unvegetated	59
High-Density Developed	574	Uncharacterized Open-Sparse Vegetation	43
Alien Grassland	224	Alien Shrubs and Grasses	26
Alien Forest	186	Kikuyu Grass Grassland/Pasture	10
Water	142	Alien Shrubland	4
Active Agriculture	66	-	-

Table 3.14-4. Maui-Kahului Harbor Landing Site Area – Wetland Acreages

Wetland Type	Acreage
Freshwater Emergent Wetland	80
Freshwater Forested/Shrub Wetland	78
Lake	65
Estuarine and Marine Deepwater	10
Freshwater Pond	5

Table 3.14-5. Maui-Kahului Harbor Landing Site Area – Acreage of Benthic Habitat Type

Habitat	Acreage	Habitat	Acreage	Habitat	Acreage
Sand	2,294	Spur and Groove	626	Land	56
Pavement	1,504	Aggregate Reef	395	Rock/Boulder	24
Unknown	1,453	Mud	159	Artificial	15

Table 3.14-6. Maui-Kapalua Landing Site Area – Acreage of Terrestrial Habitat Type

Habitat	Acreage	Habitat	Acreage
Alien Forest	383	Uncharacterized Open-Sparse Vegetation	25
Alien Grassland	262	High-Density Developed	12
Active Agriculture	217	Water	3
Low-Density Developed	120	Kikuyu Grass Grassland/Pasture	3
Alien Shrubs and Grasses	61	Alien Shrubland	2
Very Sparse Vegetation to Unvegetated	33	-	-

Table 3.14-7. Maui-Kapalua Landing Site Area – Acreage of Benthic Habitat Type

Habitat	Acreage	Habitat	Acreage
Unknown	4,852	Pavement w/Sand Channels	43
Pavement	575	Land	39
Sand	415	Aggregate Reef	10
Rock/Boulder	304	-	-

Table 3.14-8. Lānaʻi Landing Site Area – Acreage of Terrestrial Habitat Type

Habitat	Acreage	Habitat	Acreage
Kaiwe Forest and Shrubland	2,201	Koa Haole Shrubland	160
Kiawe-Koa Haole Forest and Shrubland	1,698	Water	61
Fountain Grass/Buffel Grass Grassland	1,338	Alien Grassland	41
Very Sparse Vegetation to Unvegetated	1968	Low-Density Developed	12

Table 3.14-9. Lānaʻi Landing Site Area – Acreage of Benthic Habitat Type

Habitat	Acreage	Habitat	Acreage
Unknown	18,499	Land	138
Sand	1,241	Aggregate Reef	87
Pavement	606	Rubble	9
Rock/Boulder	573	Artificial	0.1

Table 3.14-10. Molokaʻi-Kaluakoi Landing Site Area – Acreage of Terrestrial Habitat Type

Habitat	Acreage	Habitat	Acreage
Kiawe Forest and Shrubland	1,804	Lantana Shrubland	64
Alien Shrubs and Grasses	852	Water	8
Very Sparse Vegetation to Unvegetated	404	Alien Forest	2
Alien Grassland	360	Kiawe-Koa Haole Forest and Shrubland	2
Low Intensity Developed	251	Mixed Lantana and Christmas Berry Shrubland	2
Koa Haole Shrubland	194	-	-

Table 3.14-11. Molokaʻi-Kaluakoi Landing Site Area – Acreage of Benthic Habitat Type

Habitat	Acreage
Unknown	11,185
Pavement	3,850
Rock/Boulder	407
Sand	295

Table 3.14-12. Molokaʻi-Kaunakakai Landing Site Area – Acreage of Terrestrial Habitat Type

Habitat	Acreage	Habitat	Acreage
Kiawe Forest and Shrubland	313	Very Sparse Vegetation to Unvegetated	79
Wetland Vegetation	246	Alien Forest	35
Alien Shrubs and Grasses	215	Lantana Shrubland	25
Koa Haole Shrubland	162	Low Intensity Developed	22
Water	133	Alien Grassland	8

Table 3.14-13. Molokaʻi-Kuanakakai Landing Site Area - Acreage of Wetlands

Wetland Type	Acreage
Freshwater Emergent Wetland	422
Estuarine and Marine Wetland	301
Freshwater Forested/Shrub Wetland	30
Estuarine and Marine Deepwater	16

Table 3.14-14. Molokaʻi-Kaunakakai Landing Site Area – Acreage of Benthic Habitat Type

Habitat	Acreage	Habitat	Acreage
Unknown	1,518	Spur and Groove	145
Pavement	870	Scattered Coral/Rock	126
Sand	650	Artificial	18
Aggregate Reef	585	Pavement w/Sand Channels	16
Mud	172	-	-

Table 3.14-15. Oʻahu-MCBH at Kāneʻohe Landing Site Area – Acreage of Terrestrial Habitat Type

Habitat	Acreage	Habitat	Acreage
Low-Density Developed	1,269	Koa Haole Shrubland	80
High-Density Developed	437	Kiawe Forest and Shrubland	49
Alien Grassland	436	Kiawe-Koa Haole Forest and Shrubland	48
Alien Shrubland	244	Alien Forest	18
Very Sparse Vegetation to Unvegetated	130	Alien Shrubs and Grasses	15
Water	109	Wetland Vegetation	6

Table 3.14-16. Wetland Acreage in the Oʻahu–MCBH at Kāneʻohe Bay Landing Site Area

Wetland Type	Acreage
Estuarine and Marine Deepwater	112
Estuarine and Marine Wetland	74
Freshwater Forested/Shrub Wetland	2
Freshwater Pond	2

Table 3.14-17. Oʻahu-MCBH at Kāneʻohe Bay Landing Site Area – Acreage of Benthic Habitat Type

Habitat	Ac	Habitat	Ac
Pavement with sand Channels	2,559	Spur and Groove	364
Unknown	1,757	Aggregated Patch Reef	125
Pavement	1,361	Land	79
Aggregate Reef	889	Scattered Coral/Rock	59
Sand	767	Individual Patch Reef	30
Rock/Boulder	600	Mud	1

Table 3.14-18. Oʻahu-Pearl Harbor Landing Site Area – Acreage of Terrestrial Habitat Type

Habitat	Acreage	Habitat	Acreage
High-Density Developed	3,078	Very Sparse Vegetation to Unvegetated	71
Low-Density Developed	1,240	Water	48
Alien Grassland	958	Kiawe-Koa Haole Forest and Shrubland	16
Kiawe Forest and Shrubland	233	Alien Trees and Shrubs	10
Alien Shrubs and Grasses	186	Closed Kukui Forest	6
Alien Forest	108	Fountain Grass/Buffel Grass Grassland	2
Koa Haole Shrubland	87	-	-

Table 3.14-19. Wetland Acreage

Wetland Type	Acreage
Estuarine and Marine Deepwater	83
Estuarine and Marine Wetland	25
Riverine	20
Freshwater Pond	3
Freshwater Forested/Shrub Wetland	0.2

Table 3.14-20. O‘ahu Pearl Harbor Landing Site Area – Acreage of Benthic Habitat Type

Habitat	Acreage	Habitat	Acreage
Pavement	5,412	Artificial	830
Unknown	3,721	Land	659
Sand	2,010	Rubble	3
Mud	1,637	Aggregate Reef	2
Spur and Groove	1,174	-	-

Table 3.14-21. Effects of EMFs on Marine Organisms

Taxonomic Group: Species	Life stage of concern	Type of effect possible	Certainty	Implications for taxonomic group
Fish	Neonates and juveniles; migratory adults and juveniles	Interference with feeding; navigational miscue during migration	Sensory thresholds overlap with predicted field strength but nature of response not field tested	Behavioral response to power cables possible in species occurring in near-bottom waters. Altering of feeding, predator or conspecific detection
	Spawning migrants	Navigational miscue	Effect unlikely; pelagic behavior keeps fish away from strongest fields	Limited effect expected for other salmonids with similar spawning behavior
Marine mammals:	All	Navigational miscue during migration	Effect possible but unlikely to be significant	May expect similar limited effects among other porpoises or dolphins; insufficient information to determine effect on whale species
Sea turtles	Hatchlings and reproductive adults	Navigational miscue; interference with feeding	Effect possible in hatchlings; adult navigation uses multiple cues so effect less likely	May expect similar effects among other sea turtle species
Mollusks	Adults	Navigational miscue during migration or homing	Sensory threshold overlaps with predicted fields	Effects may be similar in closely related species but evidence very limited for more distantly related arthropods and other invertebrate taxa

Table 3.14-22. Potential Impact Summary – Landing Site Areas

Resource		Landing Site Areas
Terrestrial	Wetlands	Habitat removal and sedimentation during construction. Long-term shading of habitats if facility is sited immediately next to wetland. Impacts to fauna from noise perturbations during construction, altering of transit corridors. Note: No freshwater wetlands mapped in landing site areas for Lānaʻi or Maui-Kapalua.
	Surface Waters	Possible habitat removal of riparian areas, increased erosion and sedimentation during construction. Note: For Lānaʻi, Maui-Kapalua, and Molokaʻi West, impacts may be limited as streams in area are nonperennial.
	Upland Terrestrial Habitats	Habitat removal, impacts to fauna from noise perturbations during construction, altering of transit corridors, shading.
	Threatened and Endangered Species	Animals: Habitat removal, impacts to fauna from noise perturbations during construction, altering of transit corridors. Potential for increased sedimentation and erosion. EMF along the cable route. Plants: Habitat removal. Note: No known threatened and endangered species in Lānaʻi and Maui-Kapalua landing site areas.
Coastal	Benthic Habitats, less than 100 ft	Potential hydro fracture of reef damage during drilling. Impacts to fauna from noise perturbations, vessel damage, and EMF along the cable route.
	Open Water Column	Short-term increase in sedimentation and lowering of water quality in work area. EMF along cable route.
	Threatened and Endangered Species	Impacts to fauna from noise perturbations during construction, altering of transit corridors. Potential for increased sedimentation and erosion. EMF along the cable route.

Table 3.14-23. Suggested CCMs for Terrestrial Resources within the Maui Kahului Harbor Landing Site Area

Resource	Suggested CCMs
Wetlands	Wetlands associated with designated critical habitats for waterbirds and moth should be avoided.
Surface Waters	Adhere to general CCM for this resource. If working near open waters, appropriate devices should be implemented to prevent drainage to waters.
Upland Terrestrial Habitats	Adhere to general CCM for this resource. Also, habitats associated with the Kanaha Pond State Wildlife Sanctuary and Halekiʻi-Pihana Heiaus State Monument should be avoided.
Threatened and Endangered Species	Adhere to general CCM for this resource.

Table 3.14-24. Suggested CCMs for Coastal Resources within the Maui Kahului Harbor Landing Site Area

Resource	Suggested CCMs
Benthic Habitats, less than 100 ft	Within Kahului Harbor and a large area north of the harbor, the benthic habitat is mapped as sand or mud; consideration should be given to utilizing areas devoid of corals. FMAs within the harbor should be avoided.
Open Water Column	Work should be accomplished in a manner that limits the amount of sediment resuspension to the greatest extent possible. If working in the harbor or quiescent shallow waters outside of the harbor, consideration should be given to utilizing silt and turbidity curtains if benthic habitats dominated by sediment are to be disturbed.
Threatened and Endangered Species	Adhere to general CCM for this resource.

Table 3.14-25. Suggested CCMs for Terrestrial Resources in the Maui-Kapalua Landing Site Area

Resource	Suggested CCMs
Wetlands	Adhere to general CCM for this resource.
Surface Waters	Adhere to general CCM for this resource.
Upland Terrestrial Habitats	Some development exists in the southern portion of the site in the area around Kapalua; consideration should be given to utilizing currently developed sites.
Threatened and Endangered Species	Adhere to general CCM for this resource.

Table 3.14-26. Suggested CCMs for Coastal Resources in the Maui-Kapalua Landing Site Area

Resource	Suggested CCMs
Benthic Habitats, less than 100 ft	Where possible, horizontal directional drilling under a protected biological resource should be considered. In the western portion of Mokuleia Bay, sand habitats are mapped from the shoreline to the 100 ft contour line. Consideration should be given to utilizing areas devoid of corals. Honolua-Mokuleia Bay FMAs within the harbor should be avoided.
Open Water Column	Adhere to general CCMs for this resource.
Threatened and Endangered Species	Adhere to general CCM for this resource.

Table 3.14-27. Suggested CCMs for Terrestrial Resources within the Lānaʻi Landing Site Area

Resource	Suggested CCMs
Wetlands	Adhere to general CCM for this resource.
Surface Waters	Adhere to general CCM for this resource.
Upland Terrestrial Habitats	Adhere to general CCM for this resource.
Threatened and Endangered Species	Adhere to general CCM for this resource.

Table 3.14-28. Suggested CCMs for Coastal Resources within the Lānaʻi Landing Site Area

Resource	Suggested CCMs
Benthic Habitats, less than 100 ft	Areas south of Keʻena Point were mapped as having the least coral cover.
Open Water Column	Waters have the highest water quality classification, work should be accomplished in a manner that limits the amount of sediment resuspension to the greatest extent possible.
Threatened and Endangered Species	Adhere to general CCM for this resource.

Table 3.14-29. Suggested CCMs for Terrestrial Resources in the Molokaʻi-Kaunakakai Landing Site Area

Resource	Suggested CCMs
Wetlands	Adhere to general CCM for this resource.
Surface Waters	Adhere to general CCM for this resource.
Upland Terrestrial Habitats	Due to the large amount of wetlands within the landing site area, once selected, candidate sites should have robust erosion and sediment control measures to lessen the transport of sediments to adjacent wetlands and water bodies.
Threatened and Endangered Species	Adhere to general CCM for this resource.

Table 3.14-30. Suggested CCMs for Coastal Resources in the Molokaʻi-Kaunakakai Landing Site Area

Habitat	Suggested CCMs
Benthic Habitats, less than 100 ft	Where possible, horizontal directional drilling under a protected biological resource should be considered. As extensive coral habitats are mapped within the landing site area, detailed investigations of candidate routes should be performed to select the route with the least coral cover.
Open Water Column	Work should be accomplished to in a manner that limit the amount of sediment resuspension to the greatest extent possible. Along the shoreline the benthic habitat is mapped as mud; if surface disturbance is to occur in these areas, consideration should be given to using turbidity curtains. Practices should be adhered to that reduce the chance of having foreign materials and fluids to enter the marine habitat.
Threatened and Endangered Species	Adhere to general CCM for this resource.

Table 3.14-31. Suggested CCMs for Terrestrial Resources in the Molokaʻi-Kaluakoi Landing Site Area

Resource	Suggested CCMs
Wetlands	Adhere to general CCM for this resource.
Surface Waters	Adhere to general CCM for this resource.
Upland Terrestrial Habitats	Adhere to general CCM for this resource.
Threatened and Endangered Species	A designated critical habitat located between Puʻu o kaiaka stream and the Kakaʻako Gulch should be avoided. Alternative landing site areas should be investigated for presence of threatened and endangered species and their habitat. Impacts to habitats for threatened or endangered species should be avoided.

Table 3.14-32. Suggested CCMs for Coastal Resources in the Molokaʻi-Kaluakoi Landing Site Area

Resource	Suggested CCMs
Benthic Habitats, less than 100 ft	Adhere to general CCM for this resource.
Open Water Column	Waters have the highest water quality classification; work should be accomplished in manner that limits the amount of sediment resuspension to the greatest extent possible. CCMs should be followed to prevent foreign materials and fluids from entering the marine habitat.
Threatened and Endangered Species	If the candidate site is to be situated near the steep cliffs of the landing site area, the site should be investigated for Newell's shearwater nesting activities.

Table 3.14-33. Suggested CCMs for Terrestrial Resources in the Oʻahu Kāneʻohe Landing Site Area

Resource	Suggested CCMs
Wetlands	Wetlands and canals associated with protected habitats (Kaluahpi and Nuʻupla fish ponds and Kawai Nui Marsh) should be avoided to greatest extent practicable. Offshore island seabird sanctuaries should be avoided and disturbance limited to the greatest extent practicable, especially during nesting season.
Surface Waters	Surface waters associated with protected habitats (Kaluahpi and Nuʻupla fish ponds and Kawai Nui Marsh) should be avoided to greatest extent practicable.
Upland Terrestrial Habitats	Adhere to general CCM for this resource.
Threatened and Endangered Species	Adhere to general CCM for this resource.

Table 3.14-34. Suggested CCMs for Coastal Resources in the O‘ahu Kāne‘ohe Landing Site Area

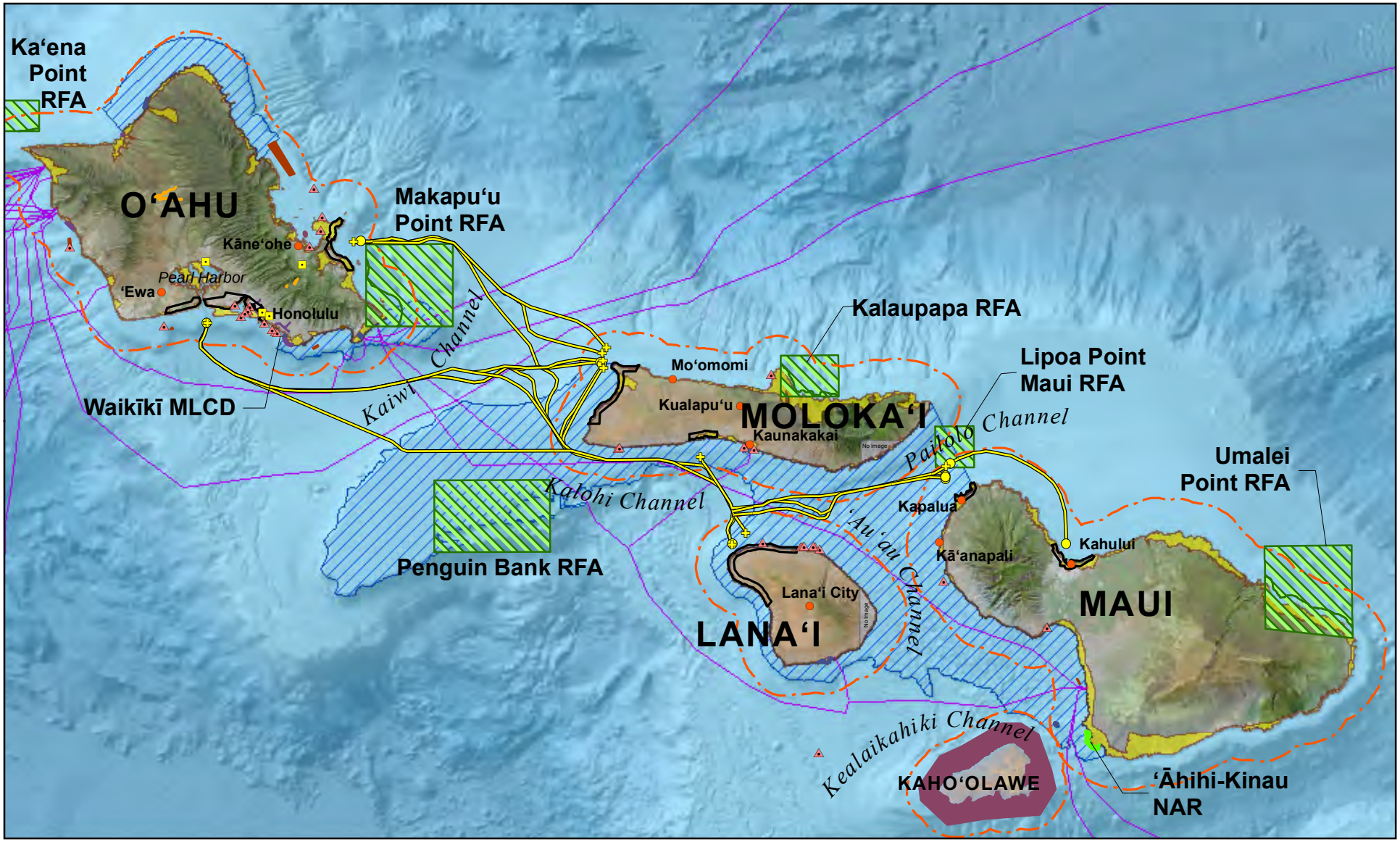
Resource	Suggested CCMs
Benthic Habitats, less than 100 ft	Where possible, horizontal directional drilling under a protected biological resource should be considered. The northernmost portion of landing site area would require the shortest crossing of shallow water habitats.
Open Water Column	Adhere to general CCM for this resource.
Threatened and Endangered Species	Adhere to general CCM for this resource.

Table 3.14-35. Suggested CCMs for Terrestrial Resources in the O‘ahu Pearl Harbor Landing Site Area

Resource	Suggested CCMs
Wetlands	Adhere to general CCM for this resource. Perturbations to the designated critical habitat for waterbirds in Honolulu Harbor should be avoided.
Surface Waters	Adhere to general CCM for this resource.
Upland Terrestrial Habitats	Adhere to general CCM for this resource.
Threatened and Endangered Species	Adhere to general CCM for this resource.

Table 3.14-36. Suggested CCMs for Terrestrial Resources in the O‘ahu Pearl Harbor Landing Site Area

Resource	Suggested CCMs
Benthic Habitats, less than 100 ft	Adhere to general CCM for this resource.
Open Water Column	Adhere to general CCM for this resource.
Threatened and Endangered Species	Impacts to beaches west of Pearl Harbor entrance used by monk seals as haulout areas should be avoided.



Marine Preserves and Marine Managed Areas

- Route with camera data *
- Route without camera data **
- Identified O'ahu Substation Locations
- Selected Cities & Communities
- Known Shipwreck Locations
- Known Existing Underwater Cables
- HIREP Study Analysis Area
- State Jurisdictional Waters (3 nautical miles)
- NOAA Humpback Whale National Marine Sanctuary
- CZM - Special Management Areas (CZM-SMAs - 2009)

Marine Managed Areas (MMA) (2003)

- Natural Area Reserve (NAR)
- Wildlife Sanctuary (WS)
- Fisheries Management Area (FMA)
- Fisheries Replenishment Area (FRA)
- Marine Life Conservation District (MLCD)
- Public Fishing Area (PFA)
- Artifical Reef (AR)
- Other
- Bottomfish Restricted Fishing Area (RFA) (2007)

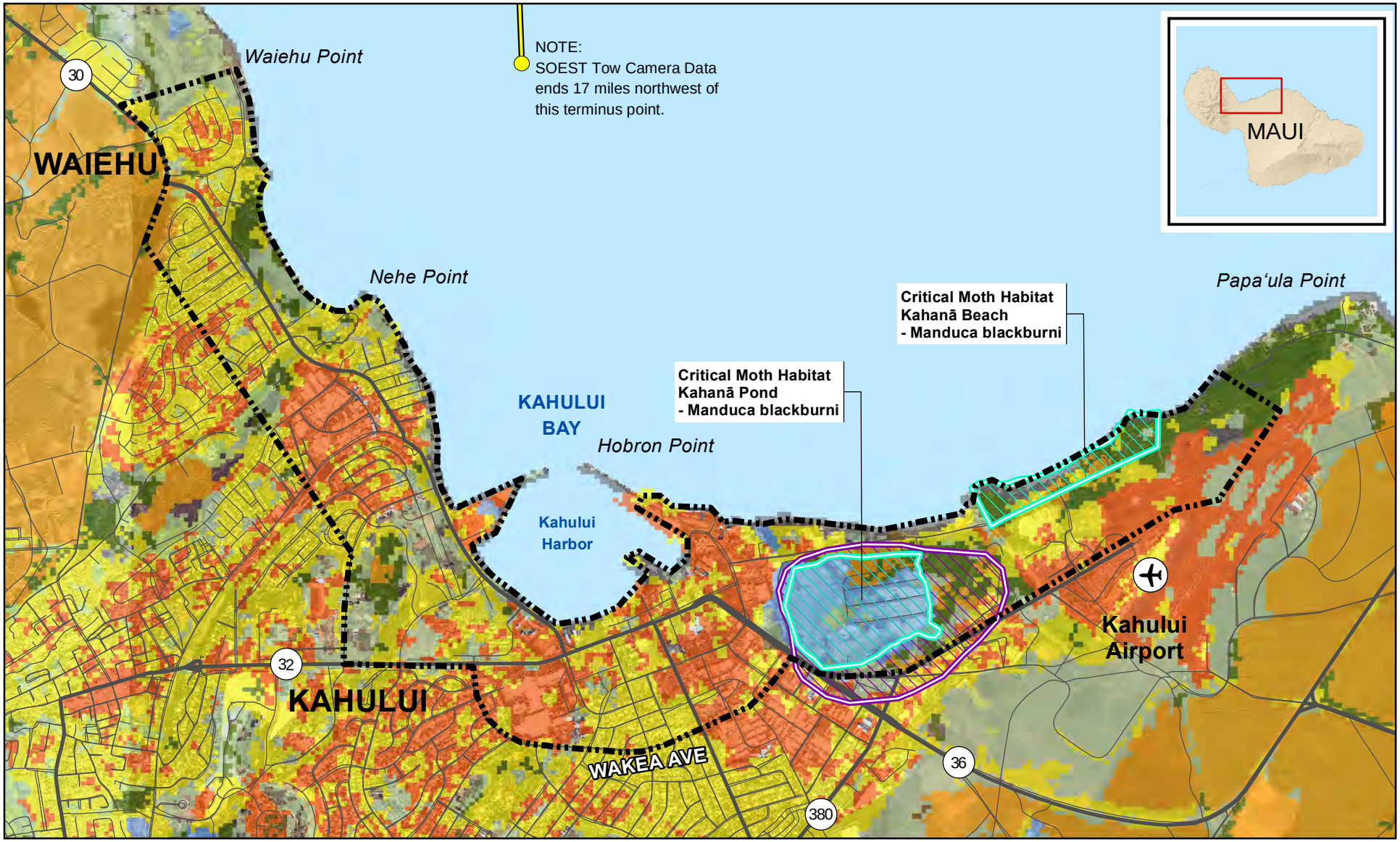
N

0 5 10 Miles

* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.

Date: 4/29/2012
Data Sources: HI-DBEDT,HI-DLNR, NOAA, CCH, UH-SOEST, AECOM, 2012

Figure 3.14-1



Kahului Maui Landing Site Area: Land Cover and Critical Habitat

- Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Critical Habitat - Water Birds
- Critical Habitat - Moth
- Open Water

USGS GAP Analysis Land Cover

- Mixed Native-Alien Forest
- Mixed Native-Alien Shrubs and Grasses
- Native Shrubland/Sparse Ohia
- Native Wet Cliff Vegetation
- Uluhe Shrubland
- Closed Ohia Forest
- Ohia Forest
- Open Koa-Ohia Forest
- Open Ohia Forest
- Water
- Wetland Grasses and Sedges
- Active Agriculture
- Alien Shrubs and Grasses
- Alien Trees and Shrubs
- High Density Developed
- Low Density Developed
- Alien Grassland
- Fountain Grass/Buffel Grass Grasslands
- Alien Shrubland
- Christmas Berry Shrubland
- Koa Haole Shrubland
- Alien Forest
- Closed Kukui Forest
- Kiawe Forest and Shrubland
- Kiawe-Koa Haole Forest and Shrubland
- Uncharacterized Forest
- Uncharacterized Shrubland
- Very Sparse Vegetation to Unvegetated

N

0 2,500 Feet

* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.

Date: 4/26/2012

Data Sources: HI-DBEDT, USGS, UH-SOEST, AECOM, 2012

Figure 3.14-2

Kahului Maui Landing Site Area: Water Bodies, Wetlands, and Riparian Areas

- Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Dam Locations

Streams
- Perennial
- Non-Perennial
- Intermittent

Wetland Type
- Freshwater Pond
- Lake
- Riverine
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Estuarine and Marine Wetland
- Estuarine and Marine Deepwater
- Open Water

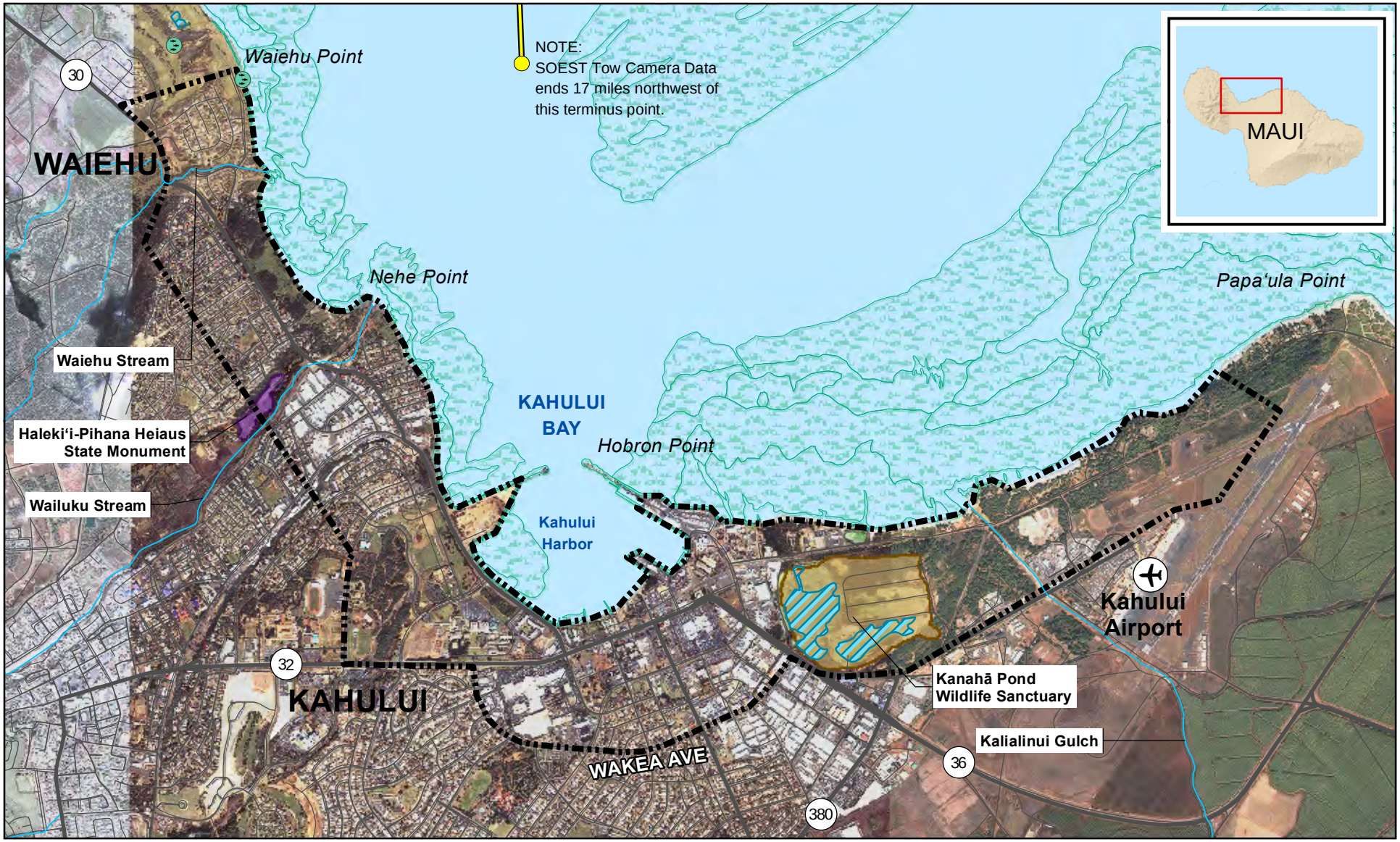
N

0 2,500 Feet

* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.

Date: 4/26/2012
Data Sources: HI-DBEDT, USFWS, UH-SOEST, AECOM, 2012

Figure 3.14-3



Kahului Maui Landing Site Area: Terrestrial Habitat and Reserves

- Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Fish Ponds (Historic & Active)
- Fish Ponds (Areas)
- Nearshore Coral Reefs
- Drainages, Rivers and Streams
- Open Water

Reserves (2011)

- Wildlife Sanctuary
- State Monument

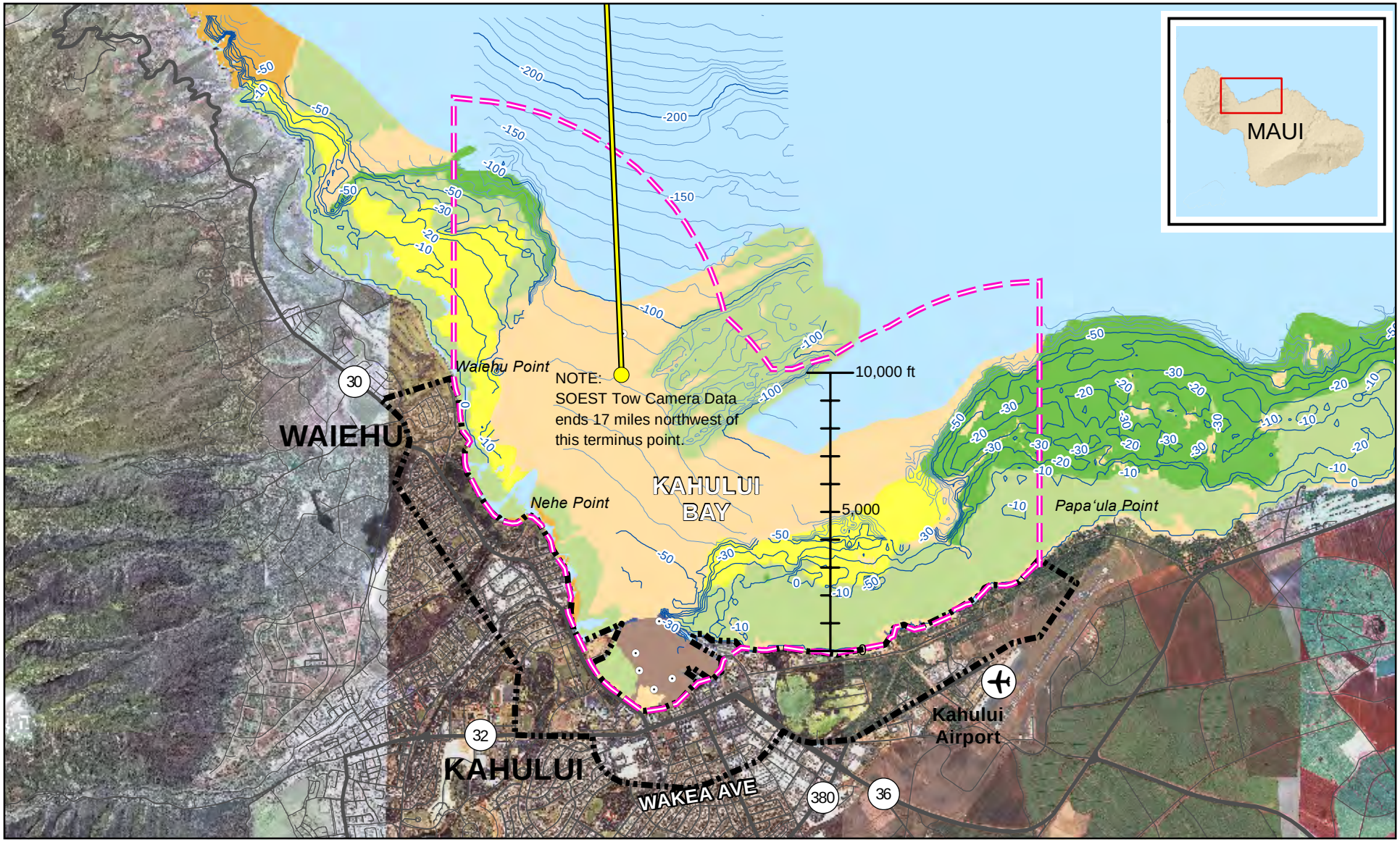
N

0 2,500 Feet

* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.

Date: 4/26/2012
Data Sources: HI-DBEDT, NOAA, UH-SOEST, AECOM, 2012

Figure 3.14-4



Kahului Maui Landing Site Area: Nearshore Benthic (Coral) Habitat

- Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Aids to Navigation
- 10,000 ft from Shoreline

Ocean Depth Intervals (10 ft) *

- Major Depth Interval
- Minor Depth Interval

Nearshore Benthic (Coral) Habitat **

Benthic Dominant Structure Type

- Coral Pavement
- Pavement with Sand Channels
- Aggregate Reef
- Aggregated Patch Reef
- Individual Patch Reef
- Rock/Boulder
- Scattered Coral/Rock
- Spur and Groove
- Mud
- Sand
- Rubble
- Artificial
- Artificial/Historical
- Open Water

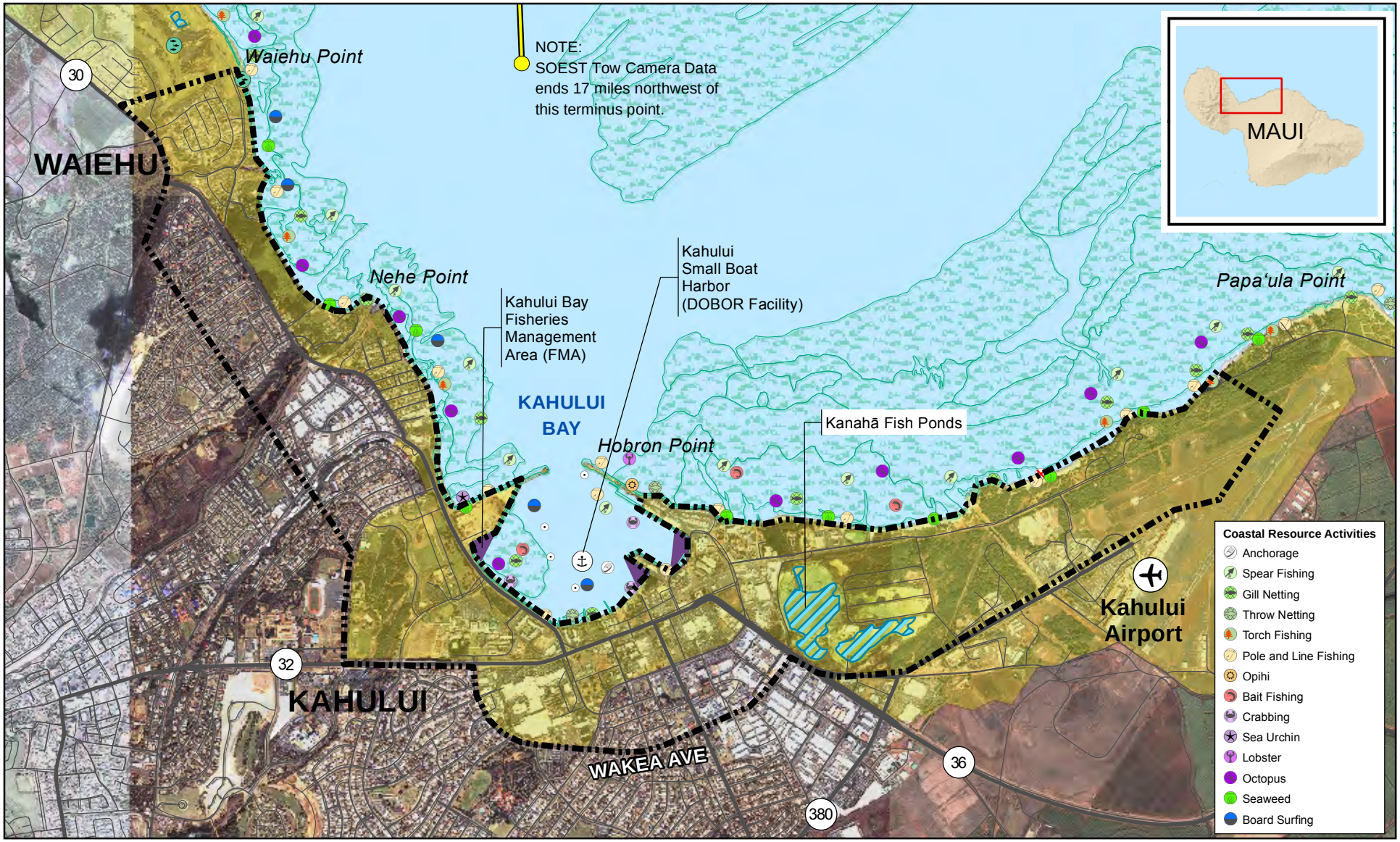
N

0 2,500 Feet

* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.
*** Major depth intervals are 10 ft intervals above 50 ft in depth, and every 100 ft in depth thereafter. Minor depth intervals are the 10 ft intervals between majors. Ocean depth bathymetry data for the Kahului Maui site is limited to what is shown on this map.
**** Coral data is limited to the information provided in the NOAA Benthic Coral data. Certain coastal areas may be missing data or be limited in coverage.

Date: 4/26/2012
Data Sources: HI-DBEDT, NOAA, UH-SOEST, AECOM, 2012

Figure 3.14-5



Kahului Maui Landing Site Area: Marine and Nearshore Coastal Resources

- Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Aids to Navigation
- Boat Facilities
- Fish Ponds (Historic & Active)
- Fish Ponds (Areas)
- Coastal Zone Management Special Management Areas CZM-SMA (2009)
- Nearshore Coral Reefs ***
- Open Water

Marine Managed Areas (MMA) (2003)

- Fisheries Management Area (FMA)

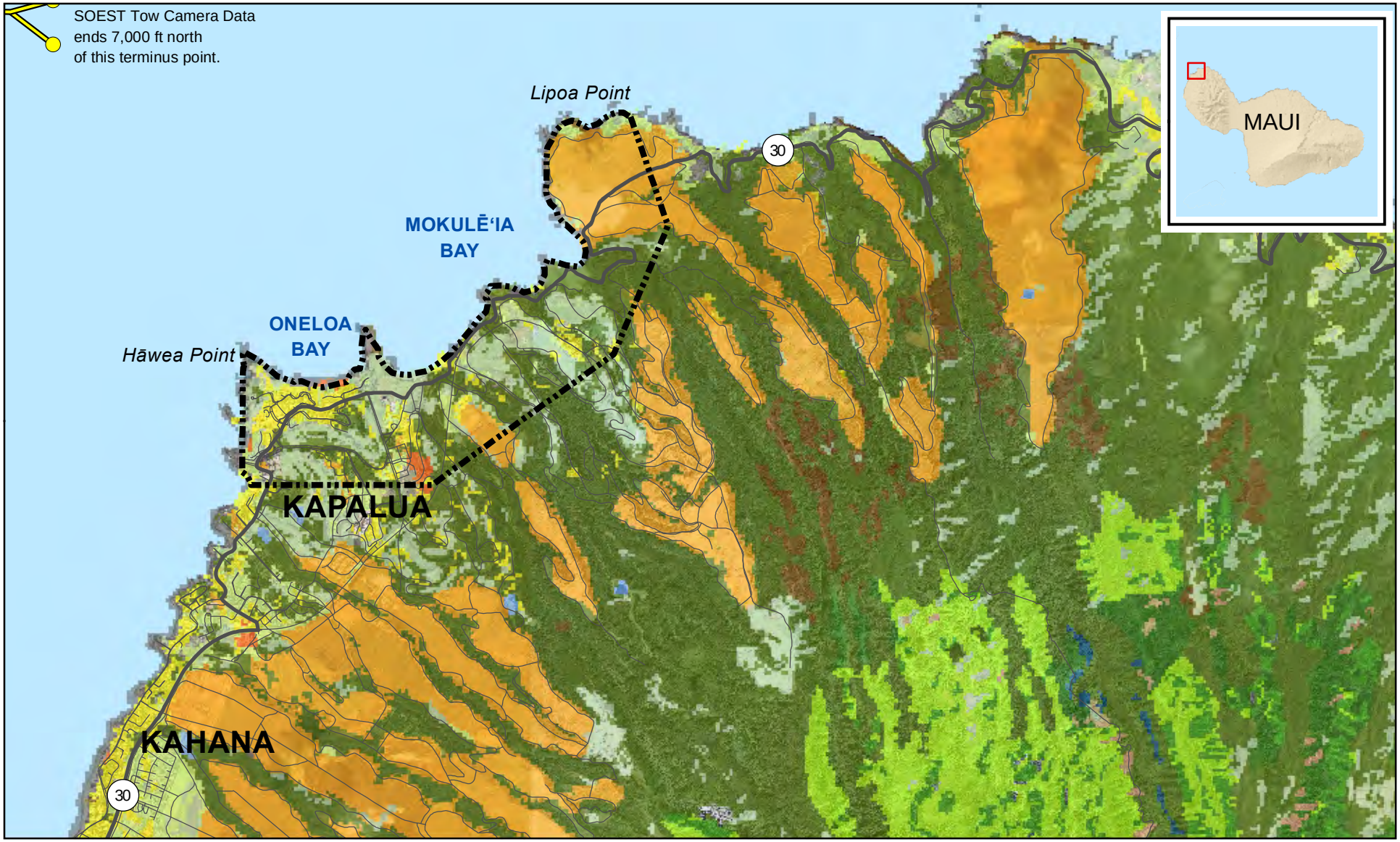
N

0 2,500 Feet

* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.
*** Coral data is limited to the information provided in the NOAA Benthic Coral data. Certain coastal areas may be missing data or be limited in coverage from the shoreline out to sea.

Date: 4/26/2012
Data Sources: HI-DBEDT, CCH, UH-SOEST, AECOM, 2012

Figure 3.14-6



West Maui Landing Site Area: Land Cover and Critical Habitat

- Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Open Water

USGS GAP Analysis Land Cover

- Mixed Native-Alien Forest
- Mixed Native-Alien Shrubs and Grasses
- Native Shrubland/Sparse Ohia
- Native Wet Cliff Vegetation
- Uluhe Shrubland
- Closed Ohia Forest
- Ohia Forest
- Open Koa-Ohia Forest
- Open Ohia Forest
- Water
- Wetland Grasses and Sedges
- Active Agriculture
- Alien Shrubs and Grasses
- Alien Trees and Shrubs
- High Density Developed
- Low Density Developed
- Alien Grassland
- Fountain Grass/Buffel Grass Grasslands
- Alien Shrubland
- Christmas Berry Shrubland
- Koa Haole Shrubland
- Alien Forest
- Closed Kukui Forest
- Kiawe Forest and Shrubland
- Kiawe-Koa Haole Forest and Shrubland
- Uncharacterized Forest
- Uncharacterized Shrubland
- Very Sparse Vegetation to Unvegetated

N

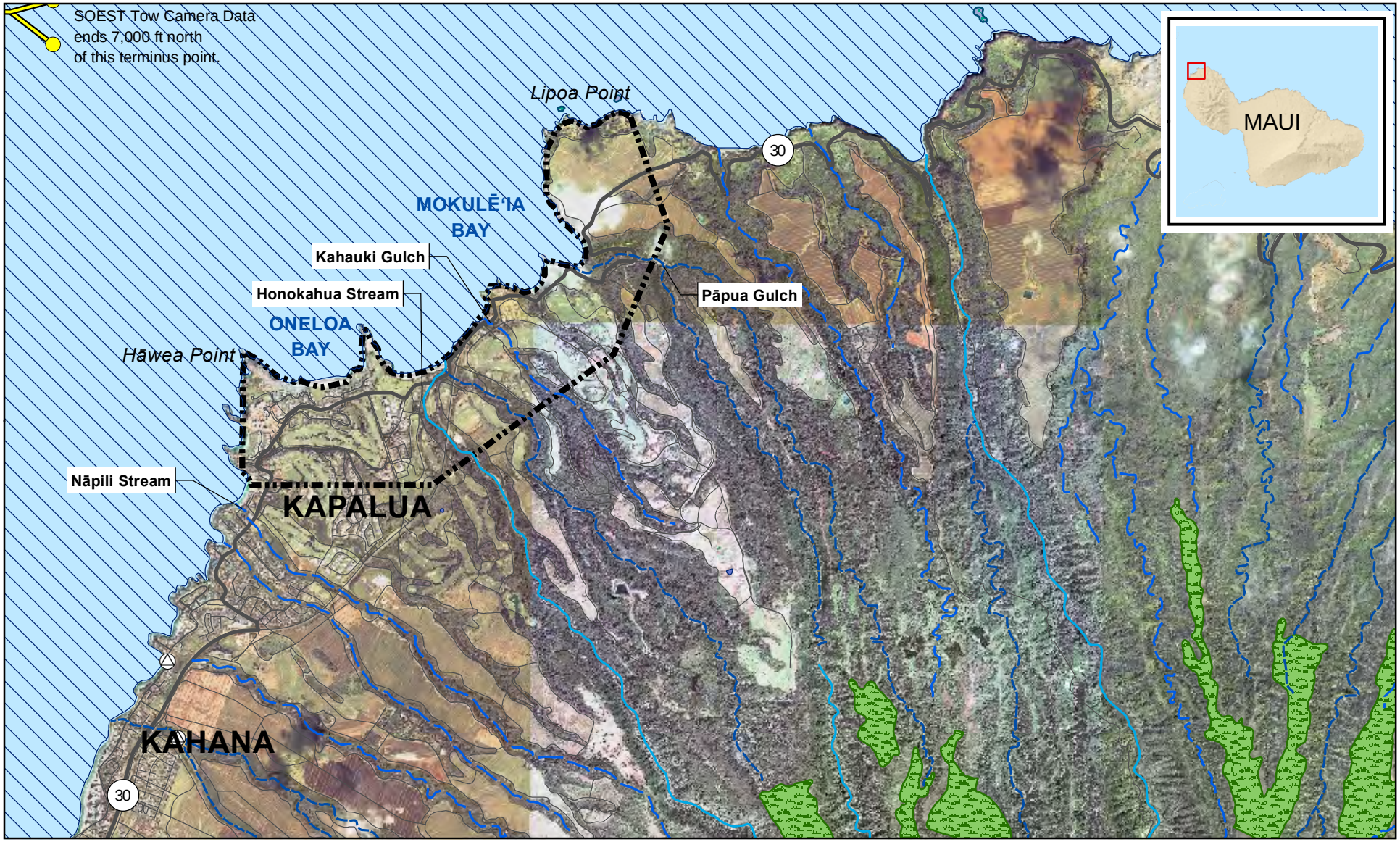
0 2,500 Feet

* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.

Date: 4/26/2012

Data Sources: HI-DBEDT, USGS, UH-SOEST, AECOM, 2012

Figure 3.14-7



West Maui Landing Site Area: Water Bodies, Wetlands, and Riparian Areas

- Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area

Streams
- Perennial
- Non-Perennial
- Intermittent

Wetland Type
- Freshwater Pond
- Lake
- Riverine
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Estuarine and Marine Wetland
- Estuarine and Marine Deepwater
- Open Water

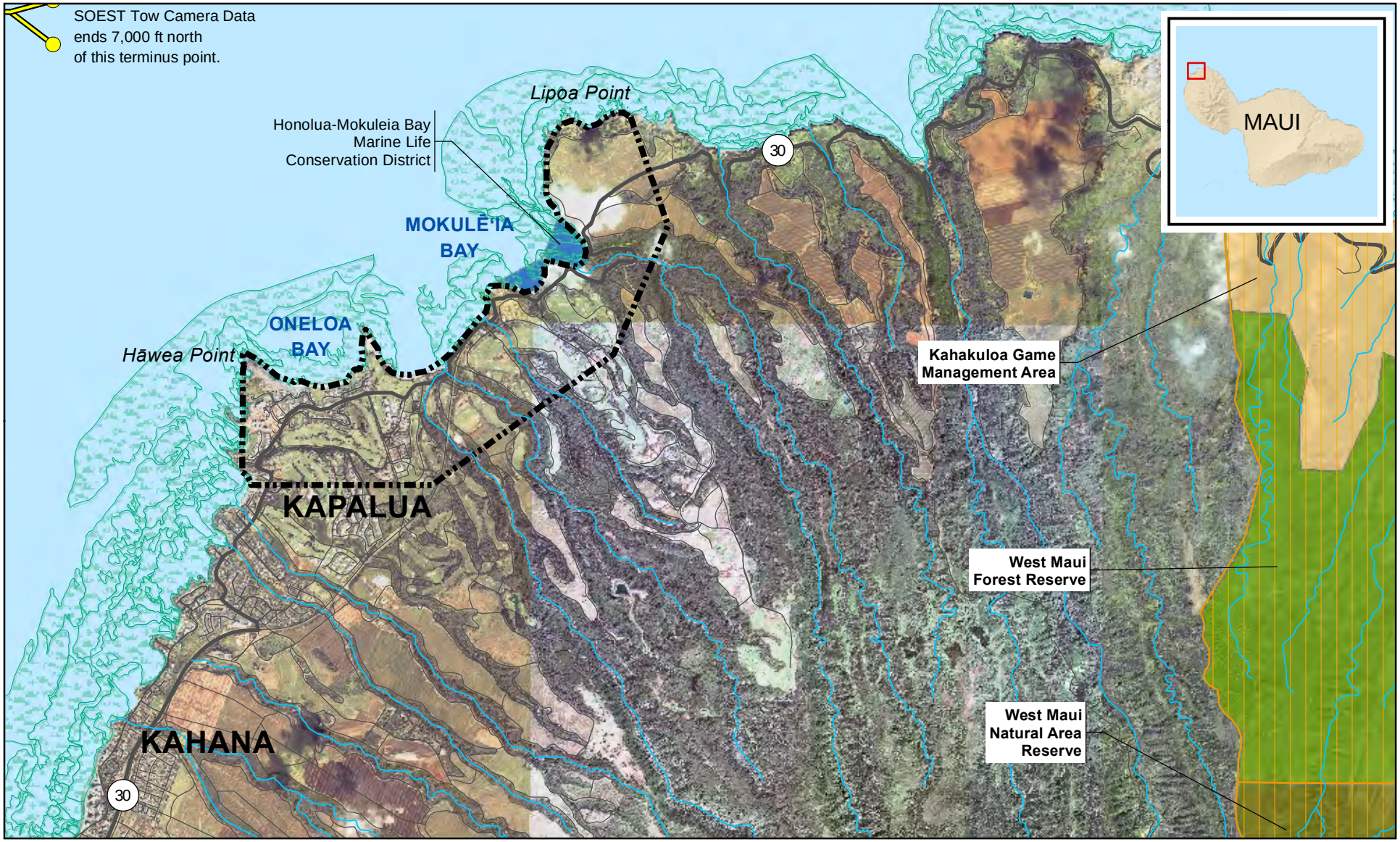
N

0 2,500 Feet

* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.

Date: 4/26/2012
Data Sources: HI-DBEDT,USGS, USFWS, UH-SOEST, AECOM, 2012

Figure 3.14-8



West Maui Landing Site Area: Terrestrial Habitat and Reserves

- Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Nearshore Coral Reefs
- Drainages, Rivers and Streams
- Open Water
- Public Hunting Areas

Reserves (2011)

- Forest Reserve (FR)
- Game Management Area (GMA)
- Natural Area Reserve
- Marine Life Conservation District

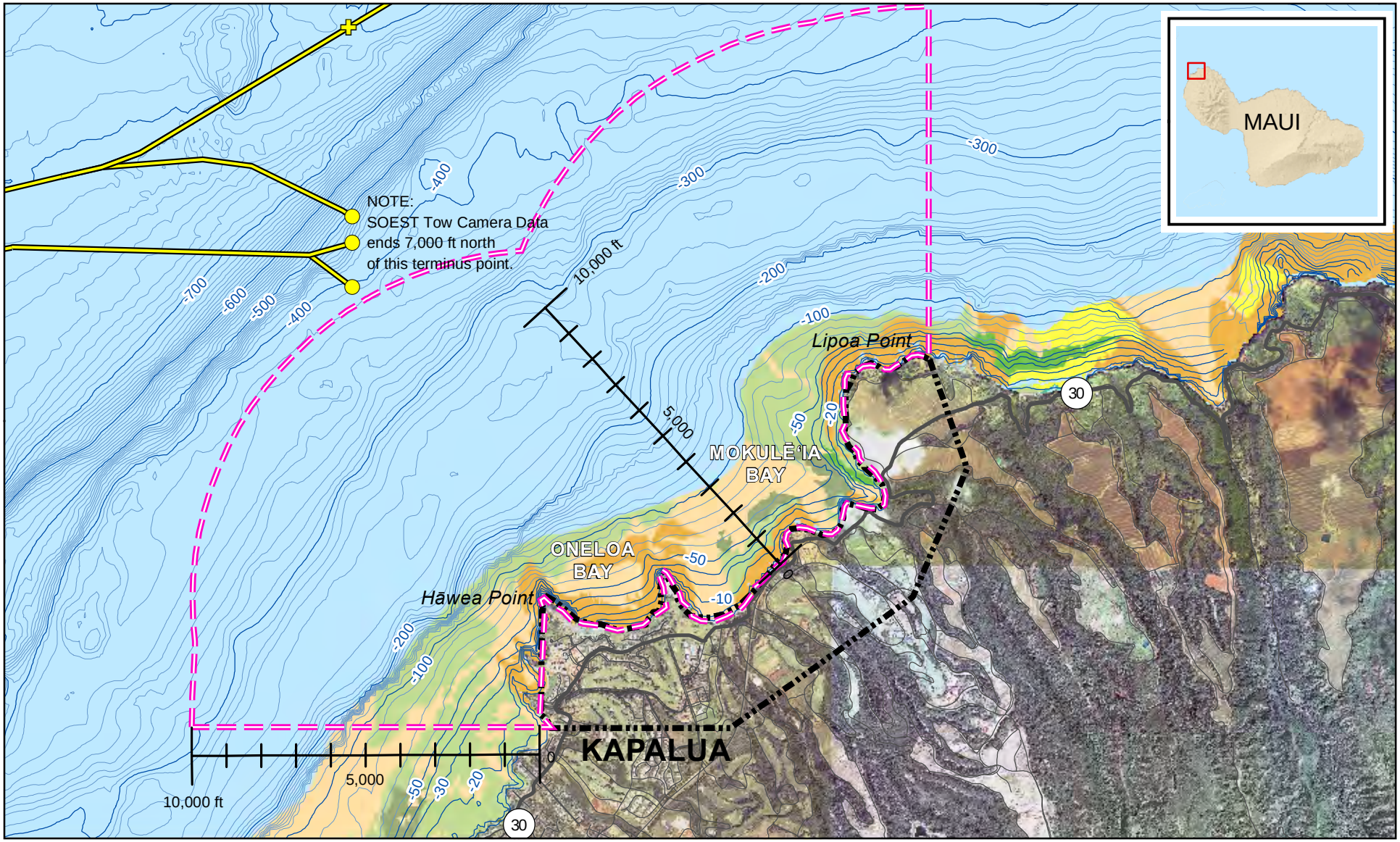
N

0 2,500 Feet

* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.

Date: 4/26/2012
Data Sources: HI-DBEDT, NOAA, USGS, UH-SOEST, AECOM, 2012

Figure 3.14-9



West Maui Landing Site Area: Nearshore Benthic (Coral) Habitat

- Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- 10,000 ft from Shoreline

Ocean Depth Intervals (10 ft) *

- Major Depth Interval
- Minor Depth Interval

Nearshore Benthic (Coral) Habitat **

Benthic Dominant Structure Type

- Coral Pavement
- Pavement with Sand Channels
- Aggregate Reef
- Aggregated Patch Reef
- Individual Patch Reef
- Rock/Boulder
- Scattered Coral/Rock
- Spur and Groove
- Mud
- Sand
- Artificial/Historical
- Rubble
- Artificial
- Open Water

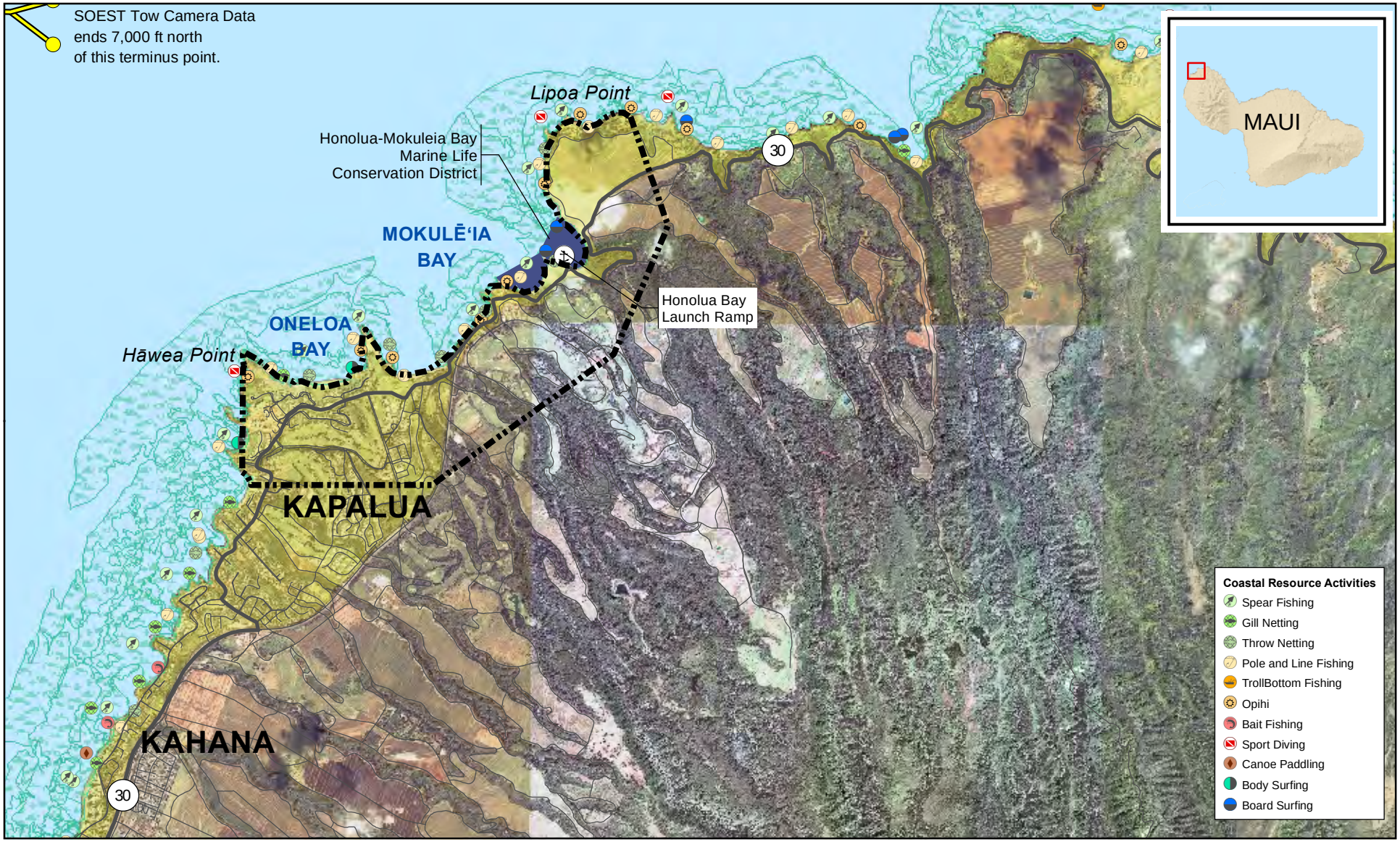
N

0 2,500 Feet

* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.
*** Major depth intervals are 10 ft intervals above 50 ft in depth, and every 100 ft in depth thereafter. Minor depth intervals are the 10 ft intervals between majors.
**** Coral data is limited to the information provided in the NOAA Benthic Coral data. Certain coastal areas may be missing data or be limited in coverage.

Date: 4/27/2012
Data Sources: HI-DBEDT, NOAA, UH-SOEST, AECOM, 2012

Figure 3.14-10



West Maui Landing Site Area: Marine and Nearshore Coastal Resources

- Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Boat Facilities
- Coastal Zone Management Special Management Areas CZM-SMA (2009)
- Nearshore Coral Reefs ***
- Open Water

Marine Managed Areas (MMA) (2003)

- Marine Life Conservation District

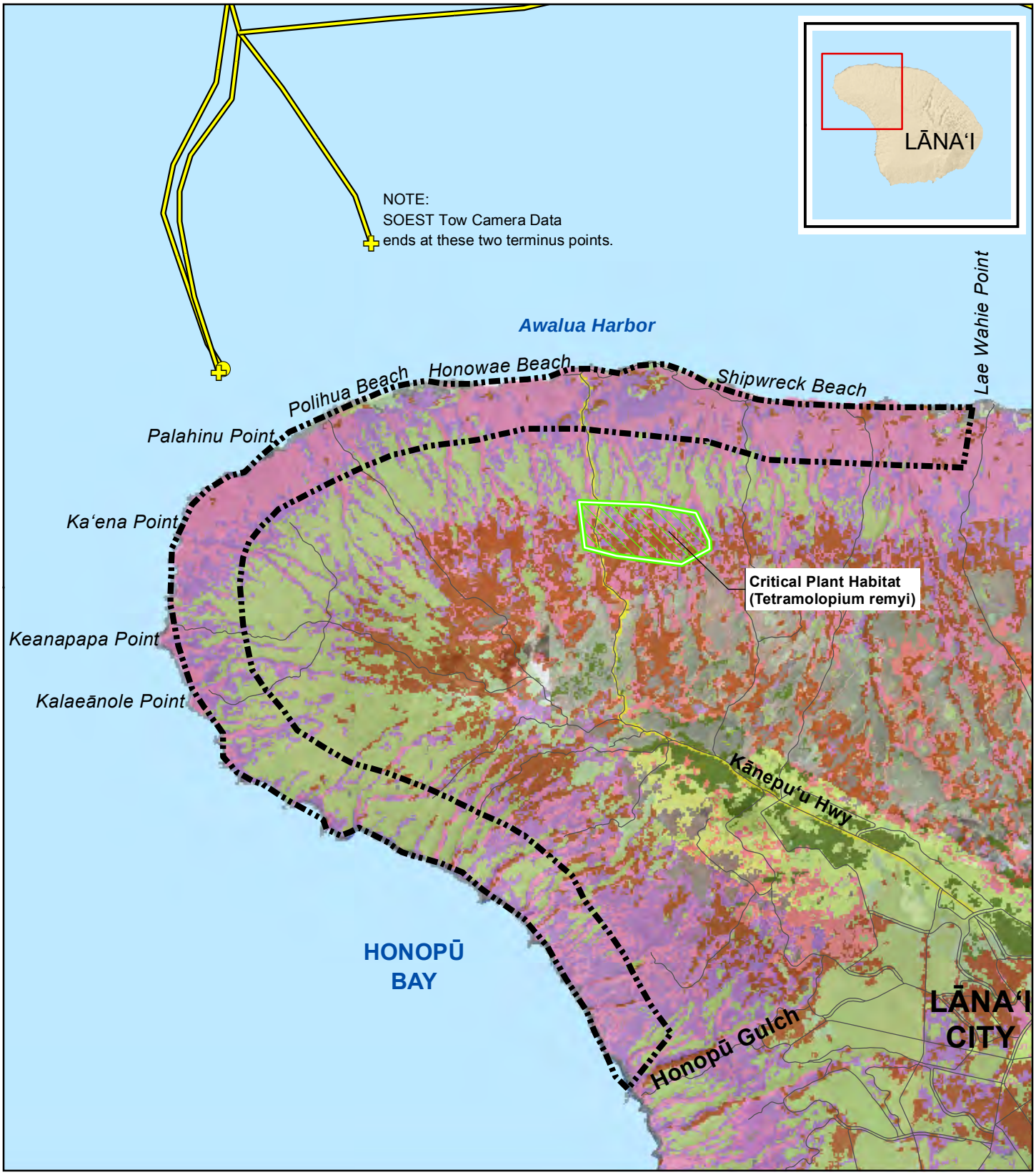
N

0 2,500 Feet

* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.
*** Coral data is limited to the information provided in the NOAA Benthic Coral data. Certain coastal areas may be missing data or be limited in coverage.

Date: 4/26/2012
Data Sources: HI-DBEDT, NOAA, UH-SOEST, AECOM, 2012

Figure 3.14-11



Lānaʻi Landing Site Area: Land Cover and Critical Habitat

- Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Critical Plant Habitat
- Open Water

USGS GAP Analysis Land Cover

- Mixed Native-Alien Forest
- Mixed Native-Alien Shrubs and Grasses
- Native Shrubland/Sparse Ohia
- Native Wet Cliff Vegetation
- Uluhe Shrubland
- Closed Ohia Forest
- Ohia Forest
- Open Koa-Ohia Forest
- Open Ohia Forest
- Water
- Wetland Grasses and Sedges
- Active Agriculture
- Alien Shrubs and Grasses
- Alien Trees and Shrubs
- High Density Developed
- Low Density Developed
- Alien Grassland
- Fountain Grass/Buffel Grass Grasslands
- Alien Shrubland
- Christmas Berry Shrubland
- Koa Haole Shrubland
- Alien Forest
- Closed Kukui Forest
- Kiawe Forest and Shrubland
- Kiawe-Koa Haole Forest and Shrubland
- Uncharacterized Forest
- Uncharacterized Shrubland
- Very Sparse Vegetation to Unvegetated

0 2,500 Feet

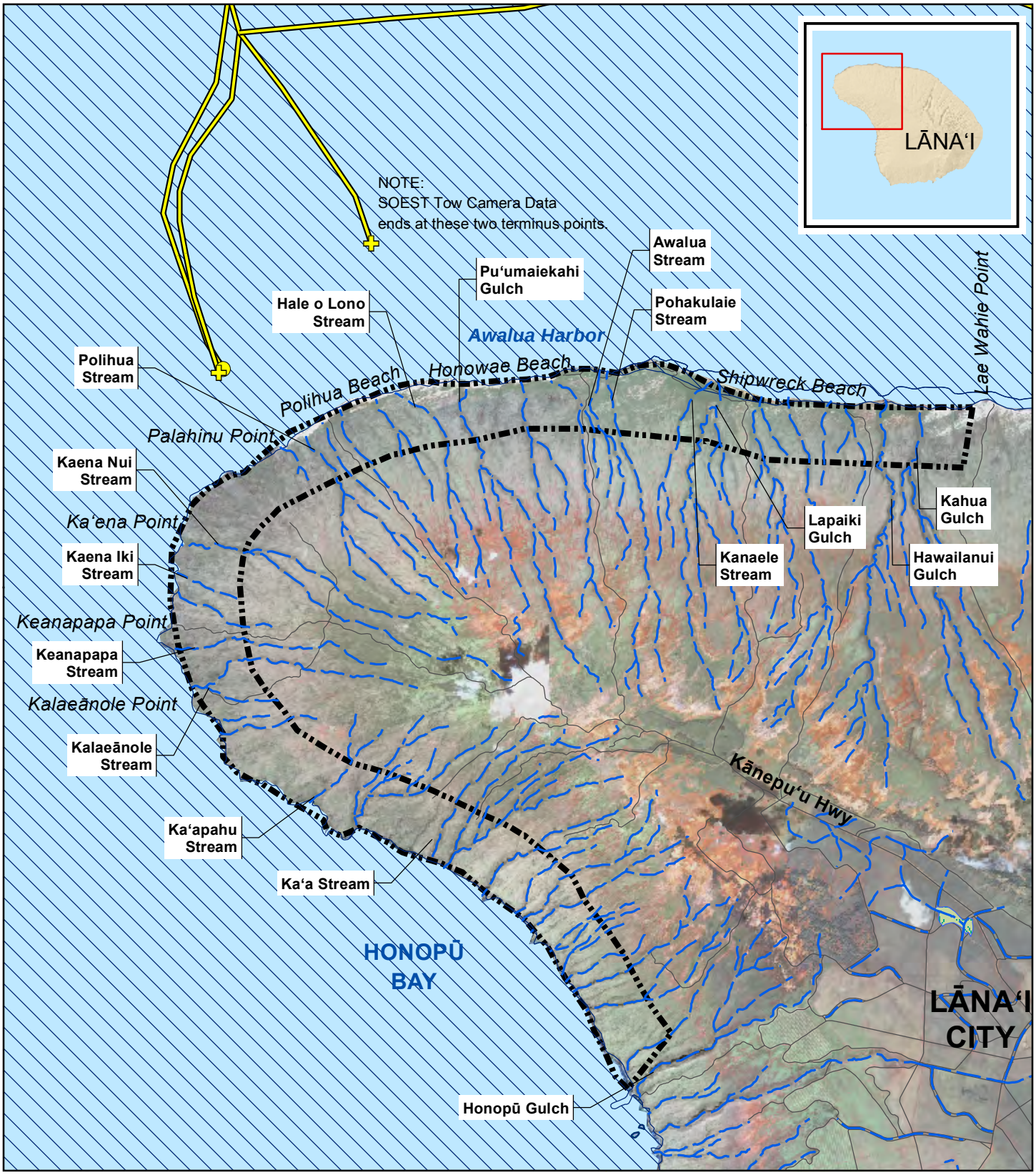
N

Date: 4/26/2012

* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.

Data Sources: HI-DBEDT, USGS, UH-SOEST, AECOM, 2012

Figure 3.14-12



Lānaʻi Landing Site Area: Water Bodies, Wetlands, and Riparian Areas

- Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area

Streams
- Perennial
- Non-Perennial
- Intermittent

Wetland Type
- Freshwater Pond
- Lake
- Riverine
- Freshwater Emergent Wetland
- Freshwater Forested/Shrub Wetland
- Estuarine and Marine Wetland
- Estuarine and Marine Deepwater
- Open Water

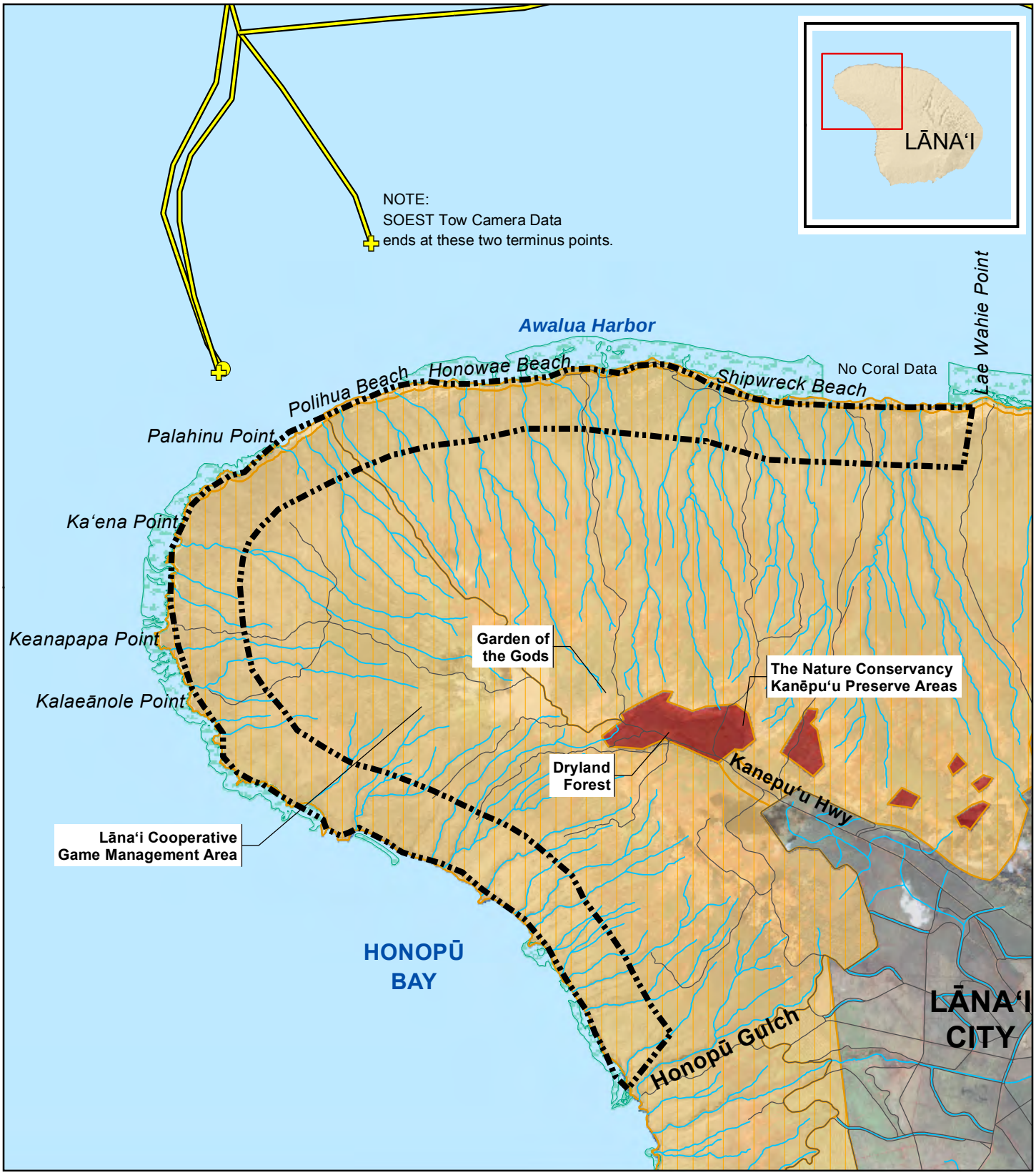
N

0 5,000 Feet

* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.

Date: 4/26/2012
Data Sources: HI-DBEDT, NOAA, USFWS, UH-SOEST, AECOM, 2012

Figure 3.14-13



Lānaʻi Landing Site Area: Terrestrial Habitat and Reserves

- Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Nearshore Coral Reefs ***
- Drainages, Rivers and Streams
- Open Water
- Public Hunting Areas

Reserves (2011)

- Game Management Area (GMA)
- The Nature Conservancy (TNC)

N

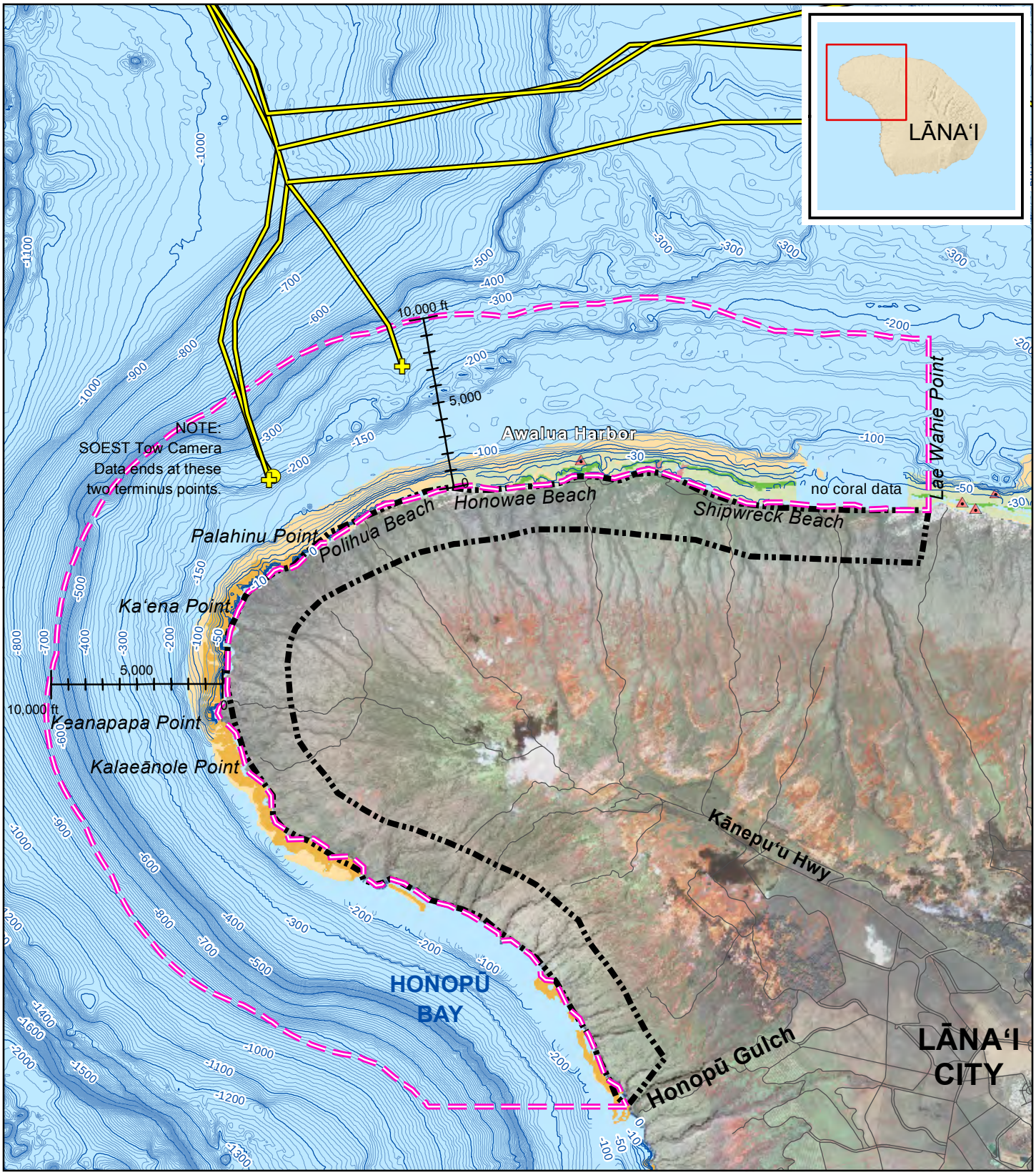
0 5,000 Feet

* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.
*** Coral data is limited to the information provided in the NOAA Benthic Coral data. Certain coastal areas may be missing data or be limited in coverage.

Date: 4/28/2012

Data Sources: HI-DBEDT, NOAA, UH-SOEST, AECOM, 2012

Figure 3.14-14



Lānaʻi Landing Site Area: Nearshore Benthic (Coral) Habitat

0 2,500 Feet

N

- Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Known Shipwreck Locations

Ocean Depth Intervals (10 ft) *

- Major Depth Interval
- Minor Depth Interval

Nearshore Benthic (Coral) Habitat **

Benthic Dominant Structure Type

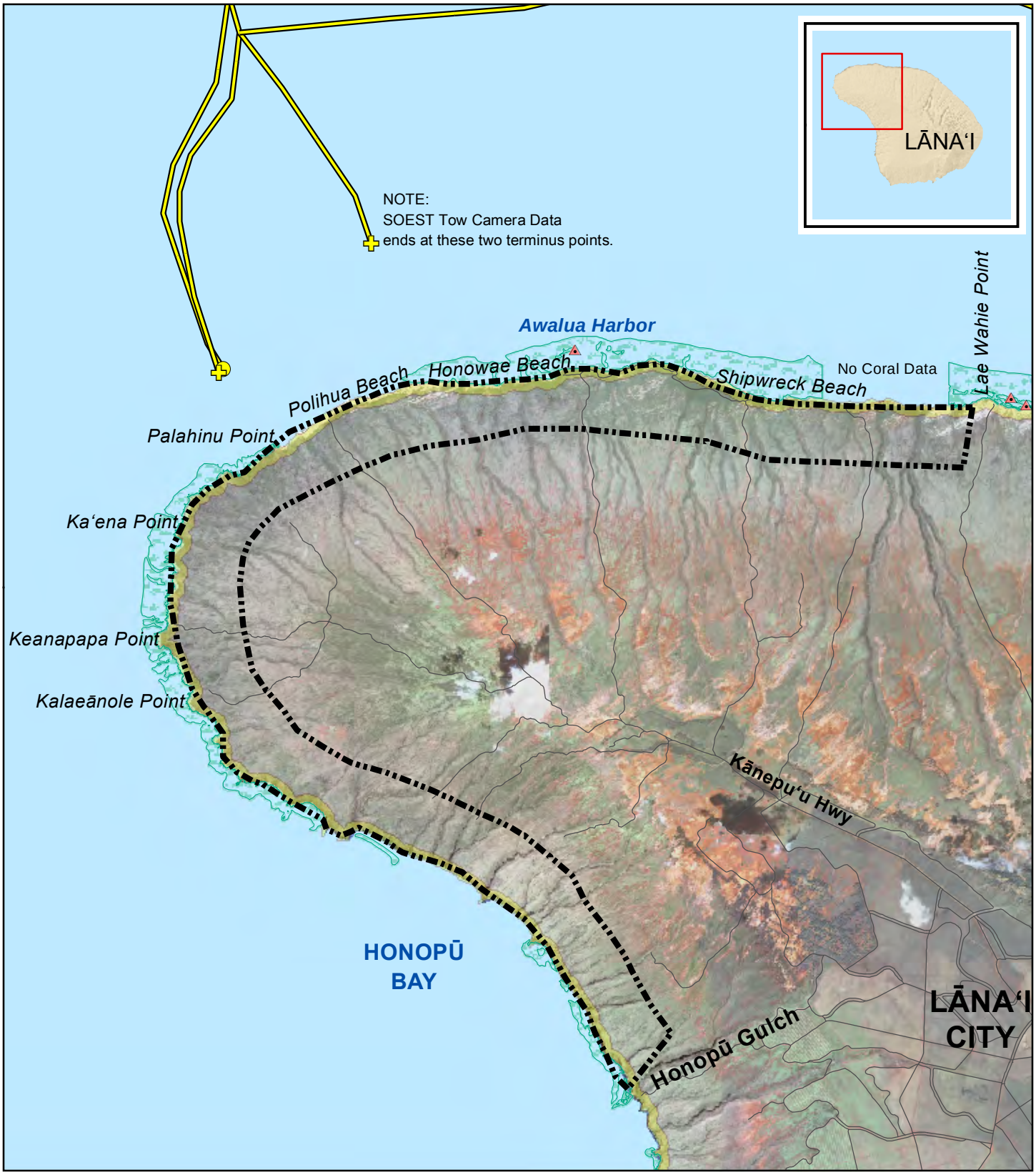
- Coral Pavement
- Pavement with Sand Channels
- Aggregate Reef
- Aggregated Patch Reef
- Individual Patch Reef
- Rock/Boulder
- Scattered Coral/Rock
- Spur and Groove
- Mud
- Sand
- Rubble
- Artificial
- Artificial/Historical
- Open Water

* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.
*** Major depth intervals are 10 ft intervals above 50 ft in depth, and every 100 ft in depth thereafter. Minor depth intervals are the 10 ft intervals between majors.
**** Coral data is limited to the information provided in the NOAA Benthic Coral data. Certain coastal areas may be missing data or be limited in coverage.

Date: 4/28/2012

Data Sources: HI-DBEDT, NOAA, CCH, UH-SOEST, AECOM, 2012

Figure 3.14-15



Lānaʻi Landing Site Area: Marine and Nearshore Coastal Resources

- Route with camera data *
- Route without camera data **
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Known Shipwreck Locations
- Coastal Zone Management Special Management Areas CZM-SMA (2009)
- Nearshore Coral Reefs ***
- Open Water

NOTE: Coastal Resource Activities and other marine data does not exist for Lana'i.

N

0 5,000 Feet

* Symbol denotes shoreward extent of tow camera data for cable route (unless otherwise noted).
** Symbol denotes shoreward approach of cable route without tow camera data.
*** Coral data is limited to the information provided in the NOAA Benthic Coral data. Certain coastal areas may be missing data or be limited in coverage.

Date: 4/26/2012
Data Sources: HI-DBEDT, NOAA, UH-SOEST, AECOM, 2012

Figure 3.14-16