3.13 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

3.13.1 Resource Definition

Terrestrial including Shoreline

The term socioeconomics describes the basic attributes and resources associated with the human environment with particular emphasis on population, housing, and employment. Typically, substantial changes in these fundamental socioeconomic indicators may influence relative variables such as the provision of community services and utilities, the cost and availability of housing, and sociocultural impacts associated with changes in community character. With regard to the various islands and communities within the HIREP study area ("study area"), these indicators will be influenced by the ultimate distribution of population and housing growth (if any) resulting from changes in employment during construction and operations/maintenance phases. Additionally, the indicators may be influenced by displacement/relocation of residential and/or commercial land uses (if any) and by significant changes in living expense related to energy costs tied to, or delinked from, changes in the price of oil.

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Environmental justice refers to an equitable spatial distribution of burdens and benefits of a proposed action with respect to minority and low-income populations (EO 12898), and children (EO 13045), as well as the provision of opportunities for meaningful involvement in the proposed action decision-making process of all people regardless of race, ethnicity, national origin, or income.

Marine

The socioeconomic analysis includes a discussion of the commercial, recreational, and subsistence fisheries in Hawai'i. In general, proposed projects with marine components can affect biomass in state and federal waters. These ecological changes can have indirect impacts to commercial fisheries and fishing communities that rely on fishing as an economic driver. Furthermore, projects with a marine component can create space-use conflicts that can reduce the ability of fishermen to conduct activities in a particular region.

3.13.2 Regulatory Setting

Federal

The major federal laws and regulations guiding the assessment of socioeconomic resources are summarized below.

Council on Environmental Quality (CEQ) Guidance

The CEQ's Regulations for Implementing the Procedural Provisions of NEPA (Title 40 C.F.R. Parts 1500–1508) provide guidance related to social and economic impact assessment by noting that the "human environment" assessed under NEPA is to be "interpreted comprehensively" to include "the natural and physical environment and the relationship of people with that environment" (Title 40 C.F.R. Part 1508.14). Furthermore, these regulations require agencies to assess "aesthetic, historic, cultural, economic, social, or health" effects, whether direct, indirect, or cumulative (Title 40 C.F.R. Part 1508.8).

EO 13045: Protection of Children from Environmental Health Risks and Safety Risks

It has been shown that children may disproportionately suffer from environmental health and safety risks. EO 13045 considers it a "high priority to identify and assess environmental health risks and safety risks that may disproportionately affect children…" and states that those risks and effects should be addressed.

EO 12898: Environmental Justice

EO 12898 (59 Federal Register 7629), entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations," was signed by President Clinton in 1994. The executive order requires that federal agencies identify and address, when appropriate, "…disproportionately high and adverse health or environmental effects of its projects, policies, and activities on minority populations and low-income populations.…" The executive order also established an Interagency Working Group that would establish guidelines on criteria for identifying environmental justice populations and strategies to deal with environmental justice issues.

Title VI of the Civil Rights Act of 1964

This regulation "prohibits discrimination on the basis of race, color, and national origin in programs and activities receiving federal financial assistance." This statute is essential to environmental justice and important to this project given the likelihood of the project to involve, affect, and coordinate with Native Hawaiian persons and communities.

State and Local

The major state and local laws and regulations guiding the assessment of socioeconomic resources are summarized below.

HRS Chapter 226, Hawai‘i State Plan

Hawai‘i’s State Plan lists three overall themes, including “individual and family self sufficiency,” “social and economic mobility,” and “community or social well-being.” The plan describes the state’s goals as “(1) A strong, viable economy, characterized by stability, diversity, and growth, that enables the fulfillment of the needs and expectations of Hawai‘i’s present and future generations. (2) A desired physical environment, characterized by beauty, cleanliness, quiet, stable natural systems, and uniqueness, that enhances the mental and physical well-being of the people. (3) Physical, social, and economic well-being, for individuals and families in Hawai‘i, that nourishes a sense of community responsibility, of caring, and of participation in community life.” In the context of socioeconomics, the plan outlines relevant objectives and policies in the following areas:

- Energy Objectives
    - Dependable, efficient, and economical statewide energy systems capable of supporting the needs of the people.
    - Increased energy self-sufficiency where the ratio of indigenous to imported energy use is increased.
    - Greater energy security and diversification in the face of threats to Hawaii's energy supplies and systems.
    - Reduction, avoidance, or sequestration of greenhouse gas emissions from energy supply and use.
- Energy Policies
    - Ensure the provision of adequate, reasonably priced, and dependable energy services to accommodate demand.
    - Support research and development as well as promote the use of renewable energy sources.
    - Ensure that the combination of energy supplies and energy-saving systems is sufficient to support the demands of growth.
    - Base decisions of least-cost supply-side and demand-side energy resource options on a comparison of their total costs and benefits when a least-cost is determined by a reasonably comprehensive, quantitative, and qualitative accounting of their long-term, direct and indirect economic, environmental, social, cultural, and public health costs and benefits.
    - Promote all cost-effective conservation of power and fuel supplies through measures including development of cost-effective demand-side management programs, education; and adoption of energy-efficient practices and technologies.

  - Ensure, to the extent that new supply-side resources are needed, that the development or expansion of energy systems uses the least-cost energy supply option and maximizes efficient technologies.
  - Support research, development, and demonstration of energy efficiency, load management, and other demand-side management programs, practices, and technologies.
  - Promote alternate fuels and energy efficiency by encouraging diversification of transportation modes and infrastructure.
  - Support actions that reduce, avoid, or sequester greenhouse gases in utility, transportation, and industrial sector applications.

- Economic Objectives
  - Increased and diversified employment opportunities to achieve full employment, increased income and job choice, and improved living standards for Hawai‘i’s people.
  - A steadily growing and diversified economic base that is not overly dependent on a few industries, and includes the development and expansion of industries on the neighbor islands.

- Economic Policies
  - Strive to achieve a level of construction activity responsive to, and consistent with, state growth objectives.
  - Encourage labor-intensive activities that are economically satisfying and that offer opportunities for upward mobility.
  - Foster greater cooperation and coordination between the government and private sectors in developing Hawai‘i’s employment and economic growth opportunities.
  - Stimulate the development and expansion of economic activities that will benefit areas with substantial or expected employment problems.
  - Provide equal employment opportunities for all segments of Hawai‘i’s population through affirmative action and nondiscrimination measures.
  - Encourage businesses that have favorable financial multiplier effects within Hawai‘i’s economy.
  - Promote and protect intangible resources in Hawai‘i, such as scenic beauty and the aloha spirit, which are vital to a healthy economy.
  - Increase effective communication between the educational community and the private sector to develop relevant curricula and training programs to meet future

employment needs in general, and requirements of new, potential growth industries in particular.

  - Foster a business climate in Hawai‘i—including attitudes, tax and regulatory policies, and financial and technical assistance programs—that is conducive to the expansion of existing enterprises and the creation and attraction of new business and industry.

- Population Objective
  - It shall be the objective in planning for Hawai‘i’s population to guide population growth to be consistent with the achievement of physical, economic, and social objectives contained in this chapter.
- Population Policies
  - Encourage an increase in economic activities and employment opportunities on the neighbor islands consistent with community needs and desires.
  - Promote increased opportunities for Hawai‘i’s people to pursue their socioeconomic aspirations throughout the islands.
  - Plan the development and availability of land and water resources in a coordinated manner so as to provide for the desired levels of growth in each geographic area.
- Potential Growth Objective
  - Planning for Hawai‘i’s economy with regard to potential growth activities shall be directed toward achievement of the objective of development and expansion of potential growth activities that serve to increase and diversify Hawai‘i’s economic base.
- Potential Growth Policies
  - Facilitate investment and employment in economic activities that have the potential for growth such as diversified agriculture, aquaculture, apparel and textile manufacturing, film and television production, and energy and marine related industries.
  - Expand Hawai‘i’s capacity to attract and service international programs and activities that generate employment for Hawai‘i’s people.
  - Enhance and promote Hawai‘i’s role as a center for international relations, trade, finance, services, technology, education, culture, and the arts.
  - Accelerate research and development of new energy-related industries based on wind, solar, ocean, and underground resources and solid waste.

  - Promote Hawai‘i’s geographic, environmental, social, and technological advantages to attract new economic activities into the state.
  - Provide public incentives and encourage private initiative to attract new industries that best support Hawai‘i’s social, economic, physical, and environmental objectives.
  - Increase research and the development of ocean-related economic activities such as mining, food production, and scientific research.
  - Encourage the development and implementation of joint federal and state initiatives to attract federal programs and projects that will support Hawai‘i’s social, economic, physical, and environmental objectives.
  - Increase research and development of businesses and services in the telecommunications and information industries.

- Housing Objectives
  - Greater opportunities for Hawai‘i’s people to secure reasonably priced, safe, sanitary, and livable homes, located in suitable environments that satisfactorily accommodate the needs and desires of families and individuals, through collaboration and cooperation between government and nonprofit and for-profit developers to ensure that more affordable housing is made available to very low-income, low-income, and moderate-income segments of Hawai‘i’s population.
  - The orderly development of residential areas sensitive to community needs and other land uses.
  - The development and provision of affordable rental housing by the State to meet the housing needs of Hawai‘i’s people.

- Housing Policies
  - Stimulate and promote feasible approaches that increase housing choices for low-income, moderate-income, and gap-group households.
  - Promote appropriate improvement, rehabilitation, and maintenance of existing housing units and residential areas.
  - Facilitate the use of available vacant, developable, and underutilized urban lands for housing.

- Individual Rights and Personal Well-being Objective
  - Planning for the state’s sociocultural advancement with regard to individual rights and personal well-being shall be directed toward achievement of the objective of increased opportunities and protection of individual rights to enable individuals to fulfill their socioeconomic needs and aspirations.

- Individual Rights and Personal Well-being Policies
    - Provide effective services and activities that protect individuals from criminal acts and unfair practices and that alleviate the consequences of criminal acts in order to foster a safe and secure environment.
    - Uphold and protect the national and state constitutional rights of every individual.
    - Ensure access to, and availability of, legal assistance, consumer protection, and other public services that strive to attain social justice.
    - Ensure equal opportunities for individual participation in society.
- Marine Resources Objectives
    - Prudent use of Hawai‘i’s land-based, shoreline, and marine resources.
    - Effective protection of Hawai‘i’s unique and fragile environmental resources.
- Marine Resources Policies
    - Exercise an overall conservation ethic in the use of Hawai‘i’s natural resources.
    - Ensure compatibility between land-based and water-based activities and natural resources and ecological systems.
    - Take into account the physical attributes of areas when planning and designing activities and facilities.
    - Manage natural resources and environs to encourage their beneficial and multiple use without generating costly or irreparable environmental damage.
    - Consider multiple uses in watershed areas, provided such uses do not detrimentally affect water quality and recharge functions.
    - Encourage the protection of rare or endangered plant and animal species and habitats native to Hawai‘i.
    - Provide public incentives that encourage private actions to protect significant natural resources from degradation or unnecessary depletion.
    - Pursue compatible relationships among activities, facilities, and natural resources.
    - Promote increased accessibility and prudent use of inland and shoreline areas for public recreational, educational, and scientific purposes.

General Plan of the County of Honolulu (O‘ahu)

The General Plan expresses the aspirations of the residents of O‘ahu, “sets forth the long-range objectives and policies for the general welfare and, together with the regional development

plans, provides a direction and framework to guide the programs and activities of the City and County of Honolulu." In the context of socioeconomics, the plan outlines relevant objectives and policies in the following areas:

- Economic Activity Objectives
    - To promote employment opportunities that will enable all the people of O'ahu to attain a decent standard of living.
    - To make full use of the economic resources of the sea.
    - To bring about orderly economic growth on O'ahu
- Economic Activity Policies
    - Encourage the growth and diversification of O'ahu's economic base.
    - Encourage the development of small businesses and larger industries that will contribute to the economic and social well-being of O'ahu residents.
    - Encourage the development in appropriate locations on O'ahu of trade, communications, and other industries of a nonpolluting nature.
    - Encourage the development of aquaculture, ocean research, and other ocean-related industries.
    - Maintain sufficient land in appropriately located commercial and industrial areas to help ensure a favorable business climate on O'ahu.
- Housing Objectives
    - To provide decent housing for all the people of O'ahu at prices they can afford.
    - To reduce land speculation in land and housing.
- Housing Policies
    - Encourage the preservation of existing housing that is affordable to low- and moderate-income persons.
    - Discourage private developers from acquiring and assembling land outside of areas planned for urban use.
- Population Objectives
    - To control the growth of O'ahu's resident and visitor populations in order to avoid social, economic, and environmental disruptions.
    - To plan for future population growth.
    - To establish a pattern of population distribution that will allow the people of O'ahu to live and work in harmony.

- Population Policies
    - Provide adequate support facilities to accommodate future growth in the number of visitors to O‘ahu.
    - Manage physical growth and development in the urban-fringe and rural areas so that:
        - An undesirable spreading of development is prevented.
        - Their population densities are consistent with the character of development and environmental qualities desired for such areas.

General Plan of the County of Maui

The Maui County General Plan is a long-term, comprehensive blueprint for the physical, economic, environmental development and cultural identity of the county. The Plan consists of a Countywide Policy Plan, the Maui Island Plan, and nine community plans. These plans “comprise goals, policies, programs and actions which are based on an assessment of current and future needs and available resources.” The community plans “provide recommendations concerning land use, density and design, transportation, community facilities, infrastructure, visitor accommodations, commercial and residential areas and other matters related to development that are specific to the region of the plan.” In the context of socioeconomics, the plan outlines relevant objectives and policies in the following areas:

- Economic Activity Objective
    - To provide an economic climate that will encourage controlled expansion and diversification of Maui County’s economic base.
- Economic Activity Policies
    - Maintain a diversified economic environment compatible with acceptable and consistent employment
    - Support programs, services, and institutions that provide economic diversification.
- Housing Objective
    - Provide affordable housing to be fulfilled by a broad cross-section of housing types.
- Housing Policy
    - Identify federal, state, county, and private lands for affordable housing development, and make a dedicated effort to reserve these lands.

- Population Objective
    - To plan the growth of resident and visitor population through a directed and managed growth plan so as to avoid social, economic, and environmental disruptions.
- Population Policies
    - Manage population growth so that the County's economic growth will be stable and the development of public and private infrastructures will not expand beyond growth limits specified in the appropriate community plans or negatively impact natural resources.
    - Balance population growth by achieving concurrency between the resident employee workforce, the job inventory created by new industries, affordable resident/employee housing, constraints on the environment and its natural resources, public and private infrastructure, and essential social services such as schools, hospitals, etc.

Molokaʻi Community Plan

This community plan, part of the General Plan for the County of Maui, reflects the current and anticipated future conditions while also advancing policies, objectives, planning goals, and implementation considerations that will guide decision making in the region. The Plan also attempts to address self-defined problem areas such as economic opportunity, infrastructure, and community control over local decisions, social recreation facilities, housing, water, and public services. The plan is also oriented to increase and improve areas, considered opportunities, such as lifestyle, cultural resources, and environment. The Molokaʻi Community Plan is in the process of being updated. In the context of socioeconomics, the plan outlines relevant objectives and policies in the following areas:

- Economic Activity Goal
    - Achieve a balanced local economy that provides preferred employment levels, long-term viability, and sustainability while meeting residents' needs, respecting cultural and natural resources, and is in harmony with Molokaʻi's rural quasi-subsistence lifestyle.
- Economic Activity Policies
    - Encourage new industries seeking to locate on Molokaʻi that offer significant employee ownership options and/or benefits such as profit sharing, stock options, and retirement plans.
    - Recognize the need for a viable base industry to provide income for fee ownership of homes.

- Housing Goal
    - Housing opportunities that are affordable, safe, and environmentally and culturally compatible for the residents of Molokaʻi.
- Housing Policy
    - Designate sufficient land area for affordable residential development in appropriate areas near established infrastructure.

Lānaʻi Community Plan

This community plan, part of the General Plan for the County of Maui, reflects the current and anticipated future conditions while also advancing policies, objectives, planning goals, and implementation considerations that will guide decision making in the region. The plan also attempts to address self-defined problem areas such as economic activity, social issues, housing, public services and utilities, environment, and transportation and infrastructure. The Plan also highlights a number of opportunities, such as its natural environment, rural community attitudes, land use patterns, and its single major landowner. The Lānaʻi Community Plan is in the process of being updated. In the context of socioeconomics, the plan outlines relevant objectives and policies in the following areas:

- Economic Activity Goal
    - Create a stable and diverse economic climate that is consistent and compatible with Lānaʻi's rural island lifestyle.
- Economic Activity Policy
    - Support land use policies that provide economic development incentives for small businesses, including, but not limited to, the provision of appropriately zoned lands for country-town business use and baseyard use.
- Housing Goal
    - Provide for the housing needs of all Lānaʻi residents in order to ensure a healthy and vibrant social and economic environment.
- Housing Policies
    - Provide sufficient land area in appropriate areas to promote the development of affordable housing and elderly care homes for Lānaʻi residents.
    - Require the development of employee housing in connection with the establishment of major economic development initiatives.

Coastal Zone Management (HRS Chapter 205a)

Because this project proposes actions related to the coastal zone, the project is required to meet the Coastal Zone Management regulations, which set out guidelines for recreational resources, historic resources, scenic and open space resources, coastal ecosystems, economic uses, coastal hazards, managing development, public participation, beach protection, and marine resources. In the context of socioeconomics, the plan outlines relevant objectives and policies in the following areas:

- Managing Development
    - Improve the development review process, communication, and public participation in the management of coastal resources and hazards.
- Managing Development Policy
    - Communicate the potential short- and long-term impacts of proposed significant coastal development early in their life-cycle and in terms understandable to the public to facilitate public participation in the planning and review process.
- Public Participation
    - Stimulate public awareness, education, and participation in coastal management.
- Public Participation Policies
    - Promote public involvement in the coastal zone management process.
    - Disseminate information on coastal management issues by means of educational materials, published reports, staff contact, and public workshops for persons and organizations concerned with coastal issues, developments, and government activities.
    - Organize workshops, policy dialogues, and site-specific mediations to respond to coastal issues and conflicts.
- Marine Resources
    - Promote the protection, use, and development of marine and coastal resources to ensure their sustainability.
- Marine Resources Policies
    - Ensure that the use and development of marine and coastal resources are ecologically and environmentally sound and economically beneficial.
    - Coordinate the management of marine and coastal resources and activities to improve effectiveness and efficiency.

Hawai‘i State Functional Plan – Housing

The Hawai‘i State Functional Plan “identified needed actions on both cost and non-cost items, e.g. legislation, budget and time-frame for implementation.” Each Functional Plan is informed by hundreds of citizens and public advisory committees. The Housing Functional Plan addresses the major concerns of increasing homeownership; expanding rental housing opportunities; expanding rental opportunities for the elderly and other special needs groups; preserving housing stock; designating and acquiring land that is suitable for residential development; and establishing and maintaining a housing information system. The plan was last updated in 1989. In the context of socioeconomics, the plan outlines relevant objectives and policies in the following areas:

- Objective D
    - Preservation of existing public and private housing stock.
- Policies to support Objective D
    - Ensure proper and timely maintenance of current public housing stock.
    - Rehabilitate deteriorating housing stock.
    - Preserve the inventory of federally subsidized below-market rental housing projects.

Hawai‘i State Functional Plan – Employment

The Hawai‘i State Functional Plan “identified needed actions on both cost and non-cost items, e.g. legislation, budget and time-frame for implementation.” Each Functional Plan is informed by hundreds of citizens and public advisory committees. The objectives of the plan are to “improve the qualifications of entry-level workers and their transition to employment; develop and deliver education, training and related services to ensure and maintain a quality and competitive workforce; improve labor exchange; improve the quality of life for workers and families; and improve planning of economic development, employment, and training activities.” The plan was last updated in 1991. In the context of socioeconomics, the plan outlines relevant objectives and policies in the following areas:

- Objective E
    - Improve planning of economic development, employment, and training activities.
- Policies to support Objective E
    - Improve employment information for planning.
    - Improve assessment and analysis of employment information for planning.
    - Coordinate human resources planning with economic development planning.

Hawai‘i State Functional Plan – Tourism

The Hawai‘i State Functional Plan “identified needed actions on both cost and non-cost items, e.g. legislation, budget and time-frame for implementation.” Each Functional Plan is informed by hundreds of citizens and public advisory committees. The objectives of the plan address “achievement of steady and balanced growth of the visitor industry hand in hand with infrastructure improvements; development and maintenance of a well-designed, high quality visitor product; respect for, and preservation and maintenance of the fragile resources which comprise Hawai‘i’s natural environment and cultural heritage; support of Hawai‘i’s diverse range of lifestyles; maintenance of a productive workforce which has opportunities for upward mobility and increases in real income; maintenance of a high consumer awareness of Hawai‘i as a visitor destination in desired markets; maintenance of visitor markets to support desired levels of economic activity, and diversification of markets to provide a secure economic base.” The plan was last updated in 1991. In the context of socioeconomics, the plan outlines relevant objectives and policies in the following areas:

- Objective 2
    - Improve the availability of affordable housing for those employed in the visitor industry. (Policy II.A.5)
- Policies in support of Objective 2
    - Impose realistic and fair employee housing requirements on projects seeking land use redesignations, general or development plan amendments, rezoning, Special Management Area permits, and building permits. (Action II.A.5.a)
    - Monitor projects that have been assessed with employee housing conditions to ensure that housing opportunities are actually being made available. (Action II.A.5.b)

Hawai‘i State Functional Plan – Energy

The Hawai‘i State Functional Plan “identified needed actions on both cost and non-cost items, e.g. legislation, budget and time-frame for implementation.” Each Functional Plan is informed by hundreds of citizens and public advisory committees. The objectives of the energy plan address the reduction of Hawai‘i’s petroleum demand through the most efficient use of all available energy resources and addresses the energy responsibilities of the State Energy Resources Coordinator, including “formulating comprehensive plans and specific proposals for the optimal development of Hawai‘i’s alternate energy resources; the conservation and efficient use of energy; the allocation and distribution of fuels; and the coordination of government and private efforts in energy activities” as well as contingency planning for energy emergencies. The plan was last updated in 1991. The plan outlines relevant objectives in the following areas:

- Moderate the growth in energy demand through conservation and energy efficiency.
- Displace oil and fossil fuels through alternate and renewable energy resources.
- Promote energy education and legislation.
- Support and develop an integrated approach to energy development and management.
- Ensure ability to implement energy emergency actions immediately in the event of fuel supply disruptions.

3.13.3 Region of Influence

U.S. Census data have been used in this section to provide a frame of reference for the analysis. As shown in Figure 3.13-1, the converter stations and landing site areas associated with the implementation of an undersea power cable system ("cable system") are located on the islands of Lānaʻi, Maui, Molokaʻi, and Oʻahu. Each of these islands, with the exception of Lānaʻi, is composed of various Census County Divisions (CCDs) that are used to present statistical information. While CCDs are not based on any political boundaries (though CCDs do not cross county borders), they do generally follow geographic features and other physical boundaries. In contrast to Census Designated Places (CDPs), aggregating CCDs for a given island in Hawaiʻi results in a grand total for that island as CCDs include those rural residents living outside of delineated CDPs.

As stated above, the island of Lānaʻi is composed of only one CCD (Lānaʻi). Maui is composed of 11 CCDs: Haiku-Pauwela, Hana, Kahului, Kihei, Kula, Lahaina, Makawao-Paia, Puunene, Spreckelsville, Waihee-Waikapu, and Wailuku. The island of Molokaʻi is composed of three CCDs: East Molokaʻi, Kalawao, and West Molokaʻi. Finally, the island of Oʻahu is composed of seven CCDs: Ewa, Honolulu, Koolauloa, Koolaupoko, Wahiawa, Waialua, and Waianae. In general, socioeconomic indicators are presented at the island level, with a remainder for the state of Hawaiʻi (essentially the island of Hawaiʻi and Kauai) and for the state of Hawaiʻi as a whole for the purposes of contextualization.

Table 3.13-1 presents the major communities within the study area by island and by CCD. This list is not exhaustive of all named communities within the study area, but instead provides a general indication of the major population centers within each CCD.

With regard to specific landing site areas and converter stations, one potential landing site area is located within the Lānaʻi CCD on Lānaʻi. Two potential landing site areas are located on Maui, with one potential landing site area located within the CCDs of Spreckelsville, Kahulio, Wailuku, and Waihee-Waikapu, and the other located entirely within the CCD of Lahaina. Two potential landing site areas are located on Molokaʻi, with one located in the West Molokaʻi CCD, and the other located on the southern side of Molokaʻi, spanning the border between East Molokaʻi and West Molokaʻi CCDs. Two landing site areas and four converter stations are located on Oʻahu.

One landing site area is one located on the eastern side of O‘ahu in the Koolaupoko CCD. The other landing site area and converter station location is along the southern side of O‘ahu, in the Ewa and Honolulu CCDs. One converter station is located in the Ewa CCD, near Pearl City and Waimalu; one converter station is located in the Koolaupoko CCD, south of Kāne‘ohe; and two converter stations are located in the Honolulu CCD, in Honolulu.

Larger economic impacts related to construction and operations/maintenance of the cable system are modeled at the state level.

3.13.4 Affected Environment

General

Population, Housing, and Economics

The following series of tables and accompanying text provide information on existing conditions for key socioeconomic indicators of population, housing, and employment at the CCD and statewide levels. For the purposes of environmental justice analysis, population information is further broken down by race and ethnicity, and data on poverty levels are presented with the goal of identifying high minority or low-income populations in the vicinity of the cable system landing site areas and converter stations. CEQ guidance suggests particular attention to minority populations that are greater than 50 percent of the total population of the reference geography and/or meaningfully greater than the proportion of minority or low-income populations in the general population. Information on populations of minors is also presented in this section for use in subsequent analysis under EO 13045, Protection of Children from Environmental Health Risks and Safety Risks, informally known as, “environmental justice for children.”

Population

Table 3.13-2 shows information on the total population for the four islands of Lāna‘i, Maui, Moloka‘i, and O‘ahu, the remainder of Hawai‘i, and the state of Hawai‘i as a whole in the years 1990, 2000, and 2010, as well as annual average growth rates for each of these geographies. The island with the largest population in 2010 was O‘ahu, with 70.1 percent of all Hawaiian residents residing there. Maui was the second-most populated island within the study area, with 10.6 percent of the population, followed by Moloka‘i (0.5 percent) and Lāna‘i (0.2 percent). Each island experienced growth since 1990, with the highest annual average growth rate between 1990 and 2010 exhibited by Maui (2.7 percent), followed by Lāna‘i (1.5 percent), O‘ahu (0.7 percent), and Moloka‘i (0.5 percent). Since 2000, however, both the islands of Lāna‘i and Moloka‘i experienced small population declines (-0.2 and -0.1 percent, respectively) after experiencing positive rates of growth between the years of 1990 and 2000. Approximately 18.5 percent of all Hawai‘i residents live outside of the study area islands. Annual average growth in

the remainder of Hawai‘i has been above 2.0 percent since 1990, with the overall rate between 1990 and 2010 at 2.5 percent. With regard to the state of Hawai‘i as a whole, annual average growth has held near 1.0 percent since 1990, with a rate of 1.1 percent from 1990 to 2010. This is higher than the rates seen for Moloka‘i and O‘ahu, but lower than the annual average growth rates for Lāna‘i and Maui for the same time period.

Table 3.13-3 shows the age breakdown for the islands of Lāna‘i, Maui, Moloka‘i, and O‘ahu, as well as the remainder of Hawai‘i and the state of Hawai‘i as a whole. Of the four islands within the study area, Moloka‘i had the largest relative population of people under the age of 18 (26.5 percent), which is larger than the percentage for the state as a whole by approximately 4 percent. Lāna‘i also had a relatively large proportion of its population under 18 (25.9 percent). Of the four islands within the study area, O‘ahu had the largest percentage of residents between the ages of 18 and 34 (24.4 percent), as well as the largest percentage of residents 85 and over (2.3 percent).

Table 3.13-4 shows information on the racial and ethnic breakdown for the islands of Lāna‘i, Maui, Moloka‘i, and O‘ahu, as well as the remainder of Hawai‘i and the state of Hawai‘i as a whole. The largest racial group in the state was Asian, with 38.6 percent of the total population. In general, Asians were also the largest racial group within the study area, comprising 55.7 percent in Lāna‘i and 43.9 percent in O‘ahu. The populations of Asian residents were relatively large on Maui and Moloka‘i, as well (28.9 and 15.5 percent, respectively), but were less than those self-identifying as White. Native Hawaiians were present on each of the four islands in relatively large proportions, with Moloka‘i exhibiting the largest percentage at 26.2 percent and O‘ahu exhibiting the largest total (90,878). It should be noted that the population identifying as “two or more races” was relatively high compared to other geographies in the U.S., with percentages for each island over 22 percent (Moloka‘i is highest at 41.1 percent). Hispanic residents composed between 6.8 and 10.4 percent of all residents on the four islands within the study area, which is a relative percentage similar to the state of Hawai‘i as a whole (8.9 percent).

The proportion of minority residents was in excess of 50 percent on each island within the study area, as well as for the remainder of Hawai‘i and the state of Hawai‘i as a whole. Total minority percentages ranged from 67.0 percent (Maui) to 86.3 percent (Lāna‘i). The percentage for the state was 77.3 percent.

Housing

Table 3.13-5 provides information on the number of housing units, housing vacancy, and tenure in 2010 for the islands of Lāna‘i, Maui, Molokau, and O‘ahu, as well as the remainder of the state and the state of Hawai‘i as a whole. O‘ahu was the island with the highest number of housing units (336,899), as well as the highest percentage of occupied housing units (92.3 percent). The island with the highest percentage of vacant housing was Moloka‘i, at 30.5

percent. Compared to the state as a whole, the islands of Molokaʻi, Lānaʻi, and Maui each had relative percentages of vacant housing higher than the state. The percentage of owner-occupied homes was over 50.6 percent for the state of Hawaiʻi. Oʻahu had a similar proportion (51.8 percent), as did the remainder of Hawaiʻi outside of the study area (51.9 percent), but the islands of Lānaʻi, Maui, and Molokaʻi each had smaller percentages (38.3, 42.7, and 43.7, respectively). The ratio between owner and renter occupied housing was almost equal on the island of Lānaʻi (38.3 to 36.7 percent, respectively).

Economics

Table 3.13-6 presents primary personal income indicators for the population of Lānaʻi, Maui, Molokaʻi, Oʻahu, as well as the remainder of the state and the state of Hawaiʻi as a whole. The median household income of the state was $66,420. The median household incomes for each of the islands ranged greatly, with Maui having the most difference, ranging between $56,125 and $118,529, depending on the individual CCD. The median household income for Lānaʻi was slightly less than the state ($63,170), and the median household incomes for each of the CCDs on Molokaʻi ($40,332–$47,886) were less than the state estimate. Per capita incomes were similarly distributed, although per capita income in Molokaʻi was higher than the state rate ($28,882) in at least one CCD.

The proportion of people in poverty (i.e., with income ratios at 0.99 or lower than the established poverty threshold) was 9.6 percent for the state of Hawaiʻi as a whole. The proportion of people in poverty was lower for the islands of Lānaʻi (2.9 percent), Maui (8.5 percent), and Oʻahu (8.8 percent). However, the proportion of people in poverty on Molokaʻi was 17.8 percent, and the proportion of residents with income ratios under 0.50 (9.3 percent) was over twice as high as the state of Hawaiʻi as a whole (4.5 percent).

Table 3.13-7 presents information on the employment status, occupations, industries, and classification of worker for the islands of Lānaʻi, Maui, Molokaʻi, and Oʻahu, as well as the remainder of Hawaiʻi and the state of Hawaiʻi as a whole. Oʻahu and Maui had the largest civilian labor forces of the four islands, with 462,842 and 78,484 people, respectively, with the largest military employment located on Oʻahu (38,936 people; 5.2 percent of the total population). Approximately one-third of the total population is not in the labor force on Lānaʻi and Oʻahu, with a higher percentage in Molokaʻi (38.5 percent), and a lower percentage in Maui (29.3 percent). The unemployment rate was highest in Molokaʻi (13.6 percent), and ranged from 4.9 percent (Oʻahu) to 6.5 percent (Maui) for the four islands in the study area. Maui and Molokaʻi exhibited higher percentages of unemployment than the state of Hawaiʻi as a whole (5.6 percent).

The management/professional, service, and sales/office occupations were most prevalent for the state of Hawaiʻi as a whole, which is a similar distribution for the islands of Oʻahu and Maui. Construction/extraction occupations were in higher percentages in Lānaʻi and Molokaʻi,

however. Just over 50 percent of all employed residents of Lāna‘i are in the arts, entertainment, recreation, accommodation, and food services industries. A relatively high percentage (23.0) was also present in Maui. The proportions of residents in these industries were lower in Moloka‘i and O‘ahu than the state of Hawai‘i as a whole, however, by a few percentage points. Education, health, and social service occupations composed a relatively large proportion of employed persons in Moloka‘i, at 26.1 percent. Approximately 8.1 percent of all jobs in the state of Hawai‘i were in the construction industry. The percentages for the islands of Lāna‘i, Maui, and Moloka‘i were all higher than the state percentage, however, at 12.6, 9.1, and 11.3 percent, respectively.

Private wage and salary workers were the most prevalent across all geographies, with percentages ranging between approximately 70 to 75 percent. Government workers were more present in Moloka‘i, on a percentage basis, than on any of the other islands (23.3 percent), while self-employed workers were more common on Maui (11.1 percent).

The unemployment figures presented above were estimates synthesized from surveys taken from 2006 to 2010, however, and the current unemployment figures for the state of Hawai‘i are much higher than the U.S. Census estimates. The latest information available at the time of writing suggested that the unemployment rate for the state was at 6.4 percent in February 2012, which was the lowest rate since February 2009, and down from 6.5 percent in January 2012. Figure 3.13-2 shows the statewide trends in unemployment from February 2010 to February 2012. Unemployment rates for the islands in the study area, for February 2012, were Lāna‘i – 3.8 percent, Maui – 6.7 percent, Moloka‘i – 13.3 percent, and O‘ahu – 5.5 percent.

Existing regional annual economic output and employment information for the state of Hawai‘i is summarized in Table 3.13-8. The data in these tables are derived from an IMPLAN input-output model existing conditions data set, as the IMPLAN input-out model itself was used in the socioeconomic analysis to estimate the relative level of economic output and employment impacts that would result from construction and operations activity. The construction industry in Hawai‘i accounts for over $6.4 billion in output (6.3 percent of the total area economic output), and approximately 41,350 workers (5.0 percent of all area employment).

Commercial, Recreational, and Subsistence Fisheries

Fishing-related activities are among those with the highest potential to be directly affected by construction and operation of an undersea power cable system. This section provides information relevant to commercial, recreational, and subsistence fisheries in Hawai‘i. Marine fisheries have a long history in Hawai‘i, and they have economic and cultural significance to the state. The market value of the seafood harvested accounts for a small share of the state's total economic activity (Pooley 1993). Nevertheless, Hawai‘i’s marine fisheries contribute to the local seafood supply and are an important source of employment and income for many local households (Pan et al. 1999). In 2010, Hawai‘i’s commercial fisheries industry generated $83.5

million in ex-vessel revenue from 30.8 million pounds of landings (Figure 3.13-3). In terms of their cultural importance, marine fish are one of the main traditional foods of Native Hawaiians, and seafood consumption is also popular among Hawai'i's many Asian ethnic groups. As a result of cultural adoption by the rest of Hawai'i's population, the per capita seafood consumption in the state is much higher than the national average (Hawai'i Department of Agriculture 2009; Hudgins 1980; Pan et al. 1999). The mild and tropical climate, as well as short distance from shore to deep sea, makes Hawai'i one of the world's finest recreational fishing grounds year-round. Marine fishing activities attract tourists to Hawai'i; they also provide Hawai'i's residents an important release from the urban lifestyle and an opportunity to engage in traditional and customary fishing practices (Pan et al. 1999; WPRFMC 2009).

Hawai'i's marine fisheries have a number of distinct characteristics. While the larger commercial fishing vessels tend to specialize in one fishery, many small boat fishermen tend to shift often among gear types and fisheries, even during same fishing trip (Hamilton and Huffman 1997; WPRFMC 2009). This participation in multiple fisheries and the ability to switch gear types and fisheries are fundamental aspects of fisheries in Hawai'i and are important to the viability of fishing operations (Pooley 1993). In addition, fishery participants often reside in one area, moor or launch their vessels in other areas, fish offshore of other areas, and land their fish in yet other areas, and they tend to move among these areas according to the gear types used, weather conditions and fishing conditions (WPRFMC 2009).

In addition, in Hawai'i's small boat fisheries, the distinction between commercial, recreational, and subsistence fishermen is extremely tenuous (Pooley 1993). Commercial fishing in Hawai'i is formally defined as fishing in which the fish harvested, either in whole or in part, are intended to enter commerce through sale, barter, or trade; recreational fishing is defined as fishing for sport or pleasure; and subsistence fishing is defined as fishing to obtain food for personal and/or community use rather than for profit sales or recreation (WPRFMC 2005; 2009). However, many otherwise recreational and subsistence fishermen sell small amounts of fish to cover trip expenses (Hamilton and Huffman 1997; Pooley 1993). Even the captains of charter boats (on which patrons pay to fish for recreational purpose) generally retain their catch for sale in the local market, unless explicit arrangements are made to the contrary (Pooley 1993). Hawai'i's seafood market is not as centralized and industrialized as other U.S. fisheries, so that it has always been feasible for small-scale fishermen to sell any or all of their catch for a respectable price (Pooley 1993). Furthermore, many people who might be regarded as "commercial" fishermen in fact hold a full-time or part-time job that provides more income than fishing—they fish and sell their catch mainly for the enjoyment (Pooley 1993). Finally, the catch of most Hawai'i residents who consider themselves recreational fishermen is consumed, either by the person who caught it or someone else (Lowe 2004); catch and release fishing is not commonly practiced. In short, the difference between the recreational and subsistence sector is blurred, and both of these sectors are poorly differentiated from the part-time commercial sector.

Notwithstanding this propensity of many recreational and subsistence fishermen to sell a portion of their catch to cover fishing trip expenses, a high value is placed on sharing fish in the extended family and community. This sharing of one's fish catch is a continuing tradition among Native Hawaiians and other ethnic groups in Hawai'i. Indeed, in some circles division of catch among family and friends is an important cultural and social obligation (Pooley 1993; WPRFMC 2012).

Commercial Fisheries

The major commercial fisheries in Hawai'i include the pelagic species, deepwater bottomfish, coral reef (inshore) species, and crustacean and precious coral fisheries. An overview of each of these fisheries is provided below, including information on targeted species, fishing gear, and the quantity and value of landings. This section also includes an overview of commercial offshore aquaculture operations in state and federal waters around Hawai'i.

Pelagic species fishery

Tuna (especially bigeye and yellowfin tuna) and billfish (especially blue marlin, striped marlin, and swordfish) are the main target species for pelagic fishing, but other species, such as mahimahi, ono (wahoo), and moonfish, are also important. Pelagic fisheries primarily use longline gear, but they also include the trolling (includes live baiting), palu ahi (daytime pelagic handlining), ika shibi (nighttime pelagic handlining) and aku boat (pole-and-line) fisheries (Boggs and Ito 1993).

Longline fishing is conducted with gear consisting of one or more mainlines over 1 nautical mile in length, to which is attached a number of branchlines with baited hooks. The mainline is suspended below the surface by floatlines attached to surface floats. Trolling involves towing lures or baited hooks behind a moving vessel, whereas handlining involves dangling baited hooks from a stationary or drifting vessel (Boggs and Ito 1993). The pole-and-line method uses live bait thrown from a fishing vessel to stimulate schools of primarily skipjack tuna into a feeding frenzy, and then simple "handpoles" equipped with barbless hooks with feathered skirts are used to catch and yank the fish into the boat with one motion (Boggs and Kikkawa 1993).

Longline fishing is by far the most economically important gear type in Hawai'i commercial fisheries, accounting for an average of 80 percent of the commercial landings by pelagic gear from 2004 through 2008, and 74 percent of the landings by all gear types (HDAR 2011). However, it is unlawful to engage in longline fishing within Hawai'i waters. Moreover, the Western Pacific Region Fishery Management Council (WPRFMC) established a buffer zone prohibiting longline fishing within a radius of 75 nautical miles off the coasts of Kauai and O'ahu, and within a radius of 50 nautical miles off the coasts of Maui, Moloka'i, Lāna'i, Kahoolawe, and the island of Hawai'i. A growing proportion of Hawai'i's longline fishery is occurring outside the U.S. EEZ—65 percent of the total longline hooks set in 2011 were outside the U.S. EEZ. The

remainder were deployed in the U.S. EEZ around the Main Hawaiian Islands (22 percent), the Northwestern Hawaiian Islands (11 percent) and the Pacific Remote Island Areas (consisting of U.S. possessions Wake Island, Jarvis Island, Howland Island, Baker Island, Kingman Reef, Palmyra Atoll, and Johnston Atoll) (2 percent) (NMFS Pacific Islands Fisheries Science Center 2012).

Figure 3.13-4 shows the amount of pelagic species sold from 2000 through 2010, and the ex-vessel value of the catch. The drop in catch in 2001 is largely due to the closure of the Hawai‘i-based longline swordfish fishery as a result of its interactions with sea turtles. The fishery was reopened in 2004 after NMFS imposed measures to minimize further interactions with sea turtles.

Figure 3.13-5 shows the average spatial distribution of the commercial pelagic species catch during the 2007–2011 period. The steep inshore dropoff along the Kona Coast on the western side of the island of Hawai‘i is especially favorable to large pelagic fish, making the area a preferred site for trollers and deep pelagic handline fishermen, who catch tuna, mahimahi, and billfish in the area (Smith 1993).

In the waters surrounding the Hawaiian Islands, the State of Hawai‘i has placed numerous fish aggregating devices (FADs) that allow fishermen to more easily locate and catch pelagic species. FADs are round buoys held in place by 2,200 pounds of chain and concrete anchors. The buoys attract schools of tuna and other important pelagic fish, such as mahimahi, ono, and billfish. Both surface and subsurface FADs have been deployed by the state (Cooperative Administration of FADs Program 2012).

Table 3.13-9 shows the average commercial landings of pelagic species for each island during the 2007–2011 period, and the average number of fishermen making those landings. Landings and participation in the longline fishery are not shown. The island of Hawai‘i accounted for the largest share of non-longline landings and participation in the pelagic species fishery. O‘ahu would account for the large majority of pelagic species landings if longline-caught fish were included in the landings estimate.

Deepwater bottomfish fishery

The deepwater bottomfish fishery in Hawai‘i targets species concentrated at depths of 30–150 fathoms (fm) including deep-slope snappers, jacks, and a single species of grouper. Most of the fishing effort for these species occurs in the steep drop-off zone of high structural complexity that surrounds the islands and banks of the Hawaiian archipelago (Max 2010). The most desirable bottomfish species are seven species known as the Deep 7 (composed of opakapaka, onaga, hapuupuu, ehu, kalekale, gindai, and lehi), which in 2010 made up 57 percent of Hawai‘i’s commercial bottomfish catch by weight and 71 percent of the ex-vessel value (NMFS Pacific Islands Fisheries Science Center 2011). In the 2010–2011 fishing year, 475 vessels

engaged in the commercial harvest of Deep 7 bottomfish (76 Federal Register 46719, August 3, 2011).

The basic handline gear used in the deepwater bottomfish fishery has remained essentially unchanged from the design used by early Hawaiians, although the adoption of braided synthetic line, power reels to haul back gear, fish finders to locate schools of fish, and GPS units and other navigational aids to find fishing grounds has improved the efficiency of fishing vessels through time (WPRFMC 2011). The gear consists of a mainline with a 3- to 5-pound sinker attached to the end with two to eight branch lines with circle hooks attached above the weight at 6- to 10-foot intervals. A chum bag containing chopped fish or squid is usually attached above the highest of these hooks to attract the fish (Kawamoto undated). When fishing on smooth or sandy bottoms, sinkers are attached directly to the mainline. On rough or rocky bottoms, however, sinkers may be attached using a short length of light line, which can break off if the sinker gets stuck, so that the mainline (and any fish caught) can be retrieved more easily (Preston 1999). Methods and gear used in the bottomfish fishery are highly selective for desired species and sizes. Fishermen use information on seasonal availability, known depth ranges, and relevant topography to target particular species (WPRFMC, NMFS, and HDAR 2012). It is unlawful to catch bottomfish with a trap, trawl, bottomfish longline, or net (HDAR 2012a).

Figure 3.13-6 shows the amount of deepwater bottomfish sold from 2000 through 2010, and the ex-vessel value of the catch. Catches of bottomfish in the waters around the Main Hawaiian Islands have been declining since the mid-1980s. In 2005, NMFS determined that overfishing is occurring on the bottomfish complex in the Hawaiian Archipelago, with the primary problem being excessive fishing mortality on the Deep 7 species in the Main Hawaiian Islands. In 2008, the Deep 7 fishery was managed through the implementation of a federally mandated total allowable catch (TAC) limit of 241,000 pounds, as a means to end overfishing of these species (WPRFMC 2011). In addition, Bottomfish Restricted Fishing Areas (BRFAs) were established to conserve spawning populations of bottomfish. It is unlawful for a person to take or possess any of the Deep 7 species while in a vessel that is drifting or anchored within a BFRA. Currently, 12 BRFAs are in effect; some of these areas extend into federal waters, but they are all administered by the State of Hawai‘i (HDAR 2012a).

Figure 3.13-7 shows the average spatial distribution of the commercial deepwater bottomfish catch during the 2007–2011 period. Specific bottomfish fishing locales favored by fishermen vary seasonally according to sea conditions and the availability and price of target species. Historically, Penguin Bank, on the western end of Moloka‘i, is one of the most important bottomfish fishing grounds, as it is the most extensive shallow shelf area in the Main Hawaiian Islands and within easy reach of major population centers. Penguin Bank is particularly important for the catch of uku, one of the few bottomfish species available in substantial quantities to Hawai‘i consumers during summer months (NMFS and WPRFMC 2006).

Table 3.13-10 shows the average commercial landings of deepwater bottomfish species for each island during the 2007–2011 period, and the average number of fishermen making those landings. Oʻahu accounted for the largest share of the landings and participation in the deepwater bottomfish fishery.

Coral reef (inshore) species fishery

Coral reef or inshore fish species are targeted using numerous fishing gears including nets, traps, hook-and-line, spear, hand, and other methods (WPRFMC 2009). Akule (bigeye scad) and ʻōpelu (mackerel scad) dominate commercial landings and are typically harvested using surround or fence nets, gillnets, or hook-and-line. Other top species by weight and value include ʻuʻu (soldierfish), uhu (parrotfish), surgeonfish, and goatfish, all of which are caught with net or hook. Fishermen baitcasting from the shore target papio and ulua (young and mature jacks, respectively) and moi (Pacific threadfin). Some coral reef fish, particularly surgeonfish, are caught with traps. Underwater fishing with spearguns—either with scuba or snorkels—is used to catch parrotfish, surgeonfish, heʻe (octopus), and squirrelfish (WPRFMC 2009). Barrier nets are used in combination with scoop nets to harvest numerous types of ornamental fish and invertebrates for the aquarium trade (WPRFMC 2009). Edible marine life collected by hand in inshore waters or intertidal areas includes opihi (limpets) and limu (seaweed).

Figure 3.13-8 shows the amount of coral reef (inshore) species sold from 2000 through 2010, and the ex-vessel value of the catch. While catches have fluctuated widely in recent years, the general trend over the past few decades has been a notable decline in Hawaiʻi's coral reef fishery resources due to overfishing, habitat degradation and destruction, and other factors (DeMello 2004; Friedlander and Rodgers 2008; Lowe 2004). One indication that overfishing is particularly important is that locations with above-average human population densities, but with inaccessible shorelines (e.g., northeast Maui), have among the healthiest fish stocks. This suggests that reef fish can be abundant near moderate to large human populations (and the urbanization and shoreline development that comes with that), if it is difficult to access and therefore fish inshore waters (Williams et al. 2008). Other studies show that overfishing can have a wide-reaching impact on coral reef ecosystems. For example, the catch of large quantities of herbivorous fish may be contributing to the current observed dominance of macroalgae in many inshore areas, such as Kāneʻohe Bay on Oʻahu and Maalaea Bay on Maui. The invasive seaweed has overgrown many of the coral reefs, resulting in loss of live coral cover (Everson and Friedlander 2004; HDAR 2007).

While intense fishing pressure has been a major cause of the decrease in Hawaiʻi's coral reef fishery resources, other mechanisms have contributed to this decline, including reduction of stream productivity due to reduction or loss of stream flow; introduction of competing and alien species; disruption and congestion of spawning and nursery; nutrient loading, eutrophication and parasitism favoring growth of opportunistic native and alien species; burying and

overgrowth of the reef environment; and changes in other habitat-related parameters within watersheds (Lowe 2004).

Owing to the poor condition of Hawai‘i’s coral reef resources, the DLNR Division of Aquatic Resources, has undertaken a number of measures to improve the management of these resources, including creation of marine protected areas. A variety of marine areas in Hawai‘i have some type of protected status; in addition to the aforementioned Bottomfish Restricted Fishing Areas, there are Marine Life Conservation Districts, Fisheries Management Areas, Fisheries Replenishment Areas, Wildlife Sanctuaries and Natural Area Reserves. However, many of these protected areas are either too small, lack suitable habitats, or are not fully protected from fishing, and therefore do not function effectively as refuges (Friedlander and Eric Brown 2004).

Many of Hawai‘i’s nearshore areas are habitat-poor with extensive barren ocean bottoms composed of bands of flat limestone and large sand patches (Ziemann et al. 2004). In an attempt to increase fish habitat, the State of Hawai‘i has constructed artificial reefs in the coastal waters of the Hawaiian Islands. The purpose of the artificial reefs is to enhance opportunities for fishermen by increasing fish biomass and species diversity. Materials used to construct the artificial reefs include car bodies, derelict vessels, concrete pipe, and concrete and tire modules. Four of the artificial reefs were deployed at depths of 50 to 100 feet, and one artificial reef was sunk in 300 to 420 feet of water for “new” bottomfish habitat (HDAR 2012b).

Figure 3.13-9 shows the average spatial distribution of the commercial coral reef (inshore) species catch during the 2007–2011 period. The southwestern side of the island of Hawai‘i is a productive fishing area for a wide range of coral reef (inshore) species, including akule, ‘ōpelu, uhu, papio, and ulua (Smith 1993). In addition, the aquarium fishery on the Kona Coast has undergone dramatic expansion over the past 20 years, and the majority of fish and invertebrates harvested in the state for the aquarium trade now come from that area (Walsh et al. 2004).

Table 3.13-11 shows the average commercial landings of coral reef (inshore) species for each island during the 200 –2011 period, and the average number of fishermen making those landings. O‘ahu accounted for the largest share of the landings and participation in the coral reef (inshore) fishery.

Crustacean fishery

The typical species targeted by this fishery are the spiny lobster, slipper lobster, and Kona crab. Lobsters are caught with nets or by hand, while the principal gear used in the Kona crab fishery is the Kona crab (hoop) net. The small tangle nets used are set on the seafloor—crabs approach the bait tied into the center of each net and get their legs tangled in the net mesh. Strings of nets are set on sandy seafloor at depths of 10 to 55 m, often adjacent to fringing reefs and rocky areas. Boats using mechanical pullers may deploy strings of 10 to 50 nets (Cascorbi

2004). Commercial Kona crab vessels usually set, haul, and reset the strings of nets several times during the day from sunrise to sunset because the entangled crabs attract predators, which not only take the crabs, but can also damage the gear (Cascorbi 2004; Uchida 1986). Traps are also used to catch lobsters and crabs, but account for a small portion of the landings (WPRFMC 2011). The spearing of Kona crab and spiny and slipper lobsters is prohibited by state law.

With the exception of a few individual fishermen, the commercial lobster fishery appears to be a part-time or opportunistic fishery (WPRFMC 2011). Around 61 percent of the lobster fishery occurs in state waters around Maui due to the year-round calm waters on Maui's south and west coasts and the restaurant market on that island (Kelly and Messer 2005). The commercial Kona crab fishery is dominated by three fishermen, who account for about half of the commercial landings (Thomas 2010). By weight, more than half of the historical commercial Kona crab harvest has occurred on Penguin Bank (WPRFMC 2011).

The deepwater shrimp has recently been added to the list of federally managed crustacean species in Hawai'i. These shrimp are generally found at depths of 200 to 1,200 m on the outer reef slopes that surround islands and deepwater banks (WPRFMC 2009). Research trapping showed that the shrimp could be readily caught in the depth range of 350–825 m in baited traps (Polovina 1993). The commercial fishing rig consists of two parts, a drop-line connected to one or more buoys, and a bottom-line along which the traps are attached. Alternatively, particularly on areas of rocky sea-floor, large-volume traps may be set individually from a single drop-line. Traps are usually left overnight when catch rates are the highest and recovered the following day (King 1988). The deepwater trap fishery for the shrimp has been highly sporadic due to frequent loss of traps, a product with a short shelf life and history of inconsistent quality and the rapid localized depletion of stocks leading to low catch rates (WPRFMC 2009).

Figure 3.13-10 shows the amount of crustacean species sold from 2000 through 2010, and the ex-vessel value of the catch. Catches decreased in 2006 due to the implementation of a state law that prohibited the taking of female Kona crabs and spiny lobsters.

Figure 3.13-11 shows the average spatial distribution of the commercial crustacean catch during the 2007–2011 period. As noted above, much of the commercial Kona crab harvest is concentrated on Penguin Bank.

Table 3.13-12 shows the average commercial landings of crustacean species for each island during the 2007–2011 period, and the average number of fishermen making those landings. O'ahu accounted for most of the landings and participation in the crustacean fishery.

Precious coral fishery

Two species of black coral are harvested in Hawai‘i for the manufacture of black coral jewelry. Harvest of precious coral is only allowed by selective gear (i.e., manned and unmanned submersibles or by hand) (WPRFMC 2009). Currently, virtually all of the black coral is harvested by a small group of scuba divers from a bed located in the Auau Channel between Lāna‘i and Maui. About 85 percent of the harvest comes from state waters, where it is most accessible. The primary operating depth of the fishermen is about 41 m (Bruckner et al. 2008). Smaller beds of black coral exist off Kauai at Makawaena Point and off the southwest coast of the island of Hawai‘i, but these beds are not currently being harvested.

Although black coral harvesting rates have remained below estimates of maximum sustainable yield, they have increased somewhat in the last 10 years (WPRFMC 2009). Research shows a decrease in the biomass of black coral within Auau Channel of at least 25 percent between 1976–2001, with a notable decline in both recruitment and the abundance of legal-sized colonies. The causes for the decline have been attributed to increased consumer demand, improved fishing techniques, and overgrowth by an invasive soft coral (Bruckner et al. 2008). In 2008, a biannual quota of 5,000 kilograms was established for the Auau Channel black coral bed. This quota applies to black coral in both state and federal waters (WPRFMC 2011).

During the 1960s and 1970s, beds of pink, gold, and bamboo coral off Makapuu, O‘ahu, were harvested by dredge and manned submersible, but those harvest operations were discontinued due to high operating costs (Grigg 1993). In 2009, however, a precious coral permit was issued for the Makapuu bed to harvesters who will be using remotely operated vehicles (WPRFMC 2011). The Makapuu bed is located in federal waters at a depth of about 400 m (Grigg 1993).

Due to state and federal fishery data confidentiality requirements, no landings information can be reported for Hawai‘i’s precious coral fishery (WPRFMC 2011). However, annual landings of black coral are estimated to average 1,014 kilograms (Bruckner et al. 2008). The precious coral fishery in Hawai‘i is worth about $50 million, including an estimated $33 million for the black coral fishery alone (Bruckner et al. 2008).

Offshore aquaculture

According to Hawai‘i Department of Agriculture and Hawai‘i Department of Natural Resources (2011), the three commercial offshore aquaculture operations described below are currently in various stages of development.

HUKILAU FOODS, LLC

In 2001, Cates International, the predecessor of Hukilau Foods, began raising moi (Pacific threadfin) from fingerling size to adults in cages placed in the open ocean on a 28-acre leased

site 2 miles off Ewa Beach, O'ahu. The company's four cages, which were in 150 feet of water and positioned about 40 feet under the surface, could hold about 1 million pounds of fish (Hukilau Foods, LLC 2012). In 2011, the company shut down operations after filing for Chapter 11 bankruptcy protection. However, Hukilau Foods plans to restart fish production in the same offshore area using larger underwater cages (Hukilau Foods, LLC 2012).

KONA BLUE WATER FARMS AND KAMPACHI FARMS, LLC

In 2005, Kona Blue Water Farms, the predecessor of Kampachi Farms, began growing out fingerling-size kahala (amberjack) in cages a half-mile off the west coast of the island of Hawai'i in an area southwest of Unualoha Point. The 50-foot-tall underwater cages are tethered by a network of anchors (Kona Blue Water Farms 2012; Simpson 2009). In 2011, the executives of Kona Blue Water Farms founded Kampachi Farms, the first U.S. offshore aquaculture operation to conduct trials in the U.S. EEZ and to experiment with raising fish in cages not anchored to the ocean bottom. To operate in the EEZ, the company received a Special Coral Reef Ecosystem Fishing Permit from NMFS. The operation involves raising kahala in cages that freely move with currents and winds in water over 2 miles deep and up to 150 miles off the west coast of the island of Hawai'i. A ship remains attached to the cages to perform routine operations (Hayse-Gregson and Diana 2011; Kampachi Farms, LLC 2012).

HAWAII OCEANIC TECHNOLOGY, INC.

In 2010, the Hawai'i Board of Land and Natural Resources granted an application from Hawai'i Oceanic Technology for a 35-year lease on a 247-acre (1 km^2) deep open ocean aquaculture site 2.6 miles off the North Kohala coast of the island of Hawai'i. The company will focus its fish farming efforts on the production of ahi (bigeye and yellowfin tuna) in anchored submerged cages (Hawai'i Oceanic Technology, Inc. 2010).

Recreational and Subsistence Fisheries

Recreational and subsistence fishing in Hawai'i is generally limited to small boats and shoreline fishing. Recreational and subsistence fishermen target most of the pelagic species, deepwater bottomfish, coral reef (inshore) species, and crustaceans caught by commercial fishermen and use many of the same types of fishing gear. As described above, among fishermen using small boats, the distinction between commercial, recreational, and subsistence fishing is extremely tenuous, with many otherwise recreational and subsistence fishermen selling small amounts of fish to cover trip expenses.

Recreational fishing is a popular pastime for people in Hawai'i, with an estimated 181,531 residents, or 13 percent of Hawai'i's population, participating in some form of recreational fishing in 2010 (NMFS Office of Science and Technology 2012). In 2006, recreational fishing-related expenditures by residents and tourists in Hawai'i were $755.9 million (Gentner and Steinback

2008). It is difficult to accurately assess the level of recreational and subsistence fishing activity in Hawai‘i because these types of fishing are not subject to mandatory catch reporting and no on-water fishing location data are collected. However, the Marine Recreational Fishing Statistical Survey does collect data on recreational fishing catches by mode (boat, shore) and area (state waters, federal waters). Recreational catch for Hawai‘i in 2010 was estimated to be 14.6 million pounds, with most of the catch being pelagic species caught by boat in federal waters (NMFS Office of Science and Technology 2012).

Few studies have attempted to quantify the economic and sociocultural importance of subsistence activities to Hawai‘i’s residents, but fishing for subsistence is known to be an important component of some communities, particularly among low-income families living in rural communities (WPRFMC 2009). One study cited in WPRFMC (2009) conducted a random survey of Moloka‘i families and found that 28 percent of their food came from subsistence activities, and for Native Hawaiian families on Moloka‘i, 38 percent of their food came from subsistence activities. The study authors also noted that virtually every family interviewed stated that subsistence was important (not just a necessary component but a desirable one) to the lifestyle of Moloka‘i. Moloka‘i is likely to represent the high end of the scale of subsistence activities among the islands due to its relative isolation, lack of employment opportunities, rural character, and continued availability of natural resources. However, subsistence fishing, hunting, and gathering are important and respected aspects of life for many Hawai‘i residents (WPRFMC 2009).

In addition to being important to household economies, subsistence fishing activities provide Hawai‘i’s residents an opportunity to engage in traditional and customary fishing practices. For example, many Hawaiians recognize the traditional importance of koa (fish houses), special areas where fish are known to aggregate and which are focal points of fishing and resource conservation (Poepoe et al. 2003). A case in point is traditional fishing of ‘ōpelu, which included an intimate knowledge of koa of this species and regular tending or feeding of koa prior to commencing fishing (Friedlander and Brown 2004). The koa would be tended a minimum of 3 days per week by feeding vegetable matter to the aggregating fish. Typically, certain koa were tended and subsequently fished by certain families. Tending would continue for approximately 2 months prior to the opening of fishing season. Today, some members in the community of Miloli‘i in South Kona on the island of Hawai‘i have started to fish ‘ōpelu again in the traditional way as part of an effort to teach youth about resource stewardship (Friedlander and Brown 2004).

Loko i‘a (fishponds) were also a fundamental part of the Hawaiian method of subsistence (Hlawati 2002). The movement away from catching fish to “growing” fish may have begun earlier than the thirteenth century and continued thereafter until the mid-nineteenth century when construction of fishponds ended. Fishponds were constructed both inland and on the coast. Those on the coast, called loko kuapa, were enclosed by man-made formations of rocks abutting the shoreline. Makaha (sluice gates) with vertical wooden slats allowed small fish to

enter the pond and prevented larger fish from exiting (‘Ao‘ao O Na Loko I‘a O Maui 2012; Hlawati 2002). The main species of fish raised in coastal ponds were awa (milkfish) and ‘anae (mullet) (Kelly 1989).

The beginning of the twentieth century marked a decline in the use of fishponds by Hawaiians for subsistence. Many of the walls of fishponds have been damaged or simply dredged and developed. Notwithstanding the dramatic reduction in the number of existing fishponds, in the past 35 years, both public and private groups have become more interested in the use and revitalization of historic fishponds. These restoration efforts recognize the inherent cultural value in fishponds, as well as their food production value (Hlawati 2002).

Maui County-O‘ahu Routing Specific

Population, housing, economics, social impacts, and environmental justice impacts are described for each specific landing site area.

In addition to these aspects of the socioeconomic environment, this section describes commercial, recreational, and subsistence fisheries in the underwater cable study area. Figure 3.13-12 shows the commercial fishery statistical areas within the study area. These statistical areas are used by commercial fishermen to report the location of catches on fish catch reports administered by the Hawai‘i Division of Aquatic Resources. Specific areas on this grid will be referred to in the following descriptions of commercial fish catches by species group in the vicinity of proposed landing site areas.

Maui

Maui-Kahului Harbor

Terrestrial

The Maui-Kahului Harbor landing site area is along the north side of Maui and includes parts of the communities of Kahului and Wailuku. As stated above, the CCDs in which the landing site area is located include Kahului, Spreckelsville, Waihee-Waiehu, and Wailuki (see Figure 3.13-13).

The population was concentrated in the Kahului and Wailuku CCDs (26,328 and 20,729 people, respectively), with 6,907 in the Waihee-Waikapu CCD and 461 people in the Spreckelsville CCD. Approximately 25.1 percent of the population in these four CCDs was under the age of 18, which was a higher proportion than the island of Maui and for state as a whole. The Kahului CCD had the highest proportion of Asian residents compared to the other four CCDs in the landing site area with 53.1 percent. Wailuku had a proportion of Asian residents near 40 percent (39.7 percent) and had a proportion of people identifying as two or more races of 32.5 percent.

Spreckelsville had a large proportion of white residents (77.0 percent) compared to the other CCDs in the landing site area area. The proportion of Hispanic residents ranged between 9.4 percent (Kahului CCD) and 10.2 percent (Wailuku CCD). The percentage of minority residents in the Kahului, Waihee-Waikapu, and Wailuku CCDs all exceeded 50 percent of the total population, with proportions at 91.4 percent, 79.4 percent, and 84.4 percent, respectively. The proportion of minority residents in the Spreckelsville CCD was lower, at 26.9 percent.

The housing units were concentrated in the Kahului and Wailuku CCDs (7,770 and 7,7631, respectively). Vacancy rates were generally low, with values ranging from 5.0 percent (Waihee-Waikapu CCD) to 9.3 percent (Wailuku CCD), although a very high rate of vacancy (30.7 percent) was present in the Spreckelsville CCD. Owner occupation was highest in the Waihee-Waikapu CCD at 80.0 percent and lowest in the Kahului CCD, at 53.2 percent.

Median household income and per capita income were highest in the Spreckelsville CCD, at $118,529 and $74,943, respectively. For the main population centers of the Kahului and Wailuku CCDs, the median household income was $56,125 and $68,035, respectively. Per capita incomes were $21,218 and $26,240 for these two CCDs. No low-income residents were present in the Spreckelsville CCD. The proportions of low-income residents in the Waihee-Waikapu, Wailuku, and Kahului CCDs were 2.8 percent, 5.7 percent, and 9.8 percent, respectively. The percentage of low-income residents in the Kahului CCD was higher than that for the state of Hawai‘i as a whole. The percentage of people unemployed in the four CCDs ranged from 6.1 percent (Kahului CCD) to 8.4 percent (Wailuku CCD). The Spreckelsville CCD had a high proportion of people with construction occupations (20.5 percent), although percentages in the other three CCDs were much less (between 8.7 and 9.4 percent).

Within the Maui-Kahului Harbor landing site area area, there are six schools: Kaahumanu Hou Christian School, Isaiah Academy for Excellence, Maui Mission School, Kahului Union Pre-School, Kama‘aina Kids Preschool, and Christ the King Preschool. Six parks are also within the Maui-Kahului Harbor landing site area area: Waiehu Heights Park, Paukukalo Park, Hoaloha Park, Kahului Harbor, Keopuolani Park, and Kahana Beach Park.

Maui residents are very aware of their environment, both in terms of geography and tourism. Residents are wary of relying too heavily on the tourism industry and County policies support economic diversification while limiting the growth of the visitor industry to areas of the island where tourism fits in with the local Community Plan. The rural setting of Maui is prized by its residents who seek to maintain a rural identity while also participating in regional economic and planning activities.

State Waters

As shown in Table 3.13-13, the waters around the Maui-Kahului Harbor Landing site area are particularly important for commercial catches of coral reef (inshore) species and crustacean

species. During the 2007–2011 period, these waters, represented by Fish Catch Area 302, accounted for an average of 13 percent and 16 percent of the study area annual commercial catch of coral reef (inshore) species and crustacean species, respectively.

Kahului Bay's shoreline access is excellent for fishing. People fish along the piers, breakwaters, and coast between the harbor and Nehe Point (Hawai'i Coastal Zone Management Program 1996). Kahului Commercial Harbor, which is the only deep-draft commercial port on Maui, accommodates a diverse range of operations and activities, including commercial, recreational, and subsistence fishing (Belt Collins Hawai'i Ltd. 2007). Established within the harbor is a Fisheries Management Area, which is bounded seaward by a line between the seaward edges of the breakwaters. The use of certain types of nets is restricted within the area, and there are total catch limits except for baitfish or akule with the proper license (HDAR 2012c). After September 11, 2001, a security zone was established around Piers 1 and 2 of Kahului Commercial Harbor and all waters inland from the tip of Pier 2 to the tip of the East Breakwater. Noncommercial ocean recreation activities such as fishing are prohibited in the zone (Belt Collins Hawai'i Ltd. 2007).

With no estuaries on Maui, schooling fish such as akule often come into Maui's harbors, including Kahului Commercial Harbor (Belt Collins Hawai'i Ltd. 2007). Commercial fishermen come into Kahului Commercial Harbor with the Maui District Manager's permission and use surround nets in the harbor basin to catch large schools of akule. Juvenile akule come in the harbor, usually on the east side around Piers 1 and 2, and they are caught only with a hook and line. Commercial fishermen also set nets in the harbor to catch nehu (anchovy), which are used as baitfish for aku (skipjack tuna) fishing (Belt Collins Hawai'i Ltd. 2007).

Diving for octopus occurs on the shallow reef in Kahului Commercial Harbor. Diving for reef fish also occurs on the reef; however, the corner of the reef near the intersection of Ka'ahumanu Avenue and Kahului Beach Road is considered to be an area of poor water quality. Rubbish and other debris accumulate there and most fishermen avoid the area. Some night diving occurs on the reef in the harbor and to a lesser extent across the entrance channel along the interlocking tetrapods that form the outer end of the West Breakwater. Throw-net fishing for various schooling fish occurs occasionally in the harbor, mainly off Hoaloha Beach and the pocket beaches fronting the hotels, such as the Maui Beach Hotel. There is a perception among throw-net fishermen, however, that fish from this area of the harbor are not safe to eat due to pollution. Some fishing for juvenile goatfish occurs in the harbor, primarily by the boat-launch ramp, where they congregate on a small sandbar. Limu gathering occurs in the harbor on the shallow reef near Kahului Beach Road (Belt Collins Hawai'i Ltd. 2007).

Recreational fishermen at Kanaha Park must time their fishing around the presence of other recreational users. Windsurfing is popular in the Kahului area, making it difficult for fishermen to access some areas safely during the daytime. Moreover, the fact that hotels and resorts line the

shoreline can be a deterrent to fishing access in some areas, especially in the daytime (Lowe 2004).

Maui-Kapalua (West Maui)

Terrestrial

The Maui-Kapalua landing site area is along the northwest edge of Maui and includes part of the community of Kapalua. As stated above, the CCD in which the landing site area is located is Lahaina (see Figure 3.13-14).

The total population of the Lahaina CCD was 22,156. Approximately 21.9 percent of the population in the Lahaina CCD was under the age of 18, which was a slightly lower percentage than that for the island of Maui and the state as a whole. The racial group with the highest percentage of residents in the Lahaina CCD was White, with 42.2 percent. Asian residents had the second largest proportion (28.8 percent), followed by people who identified as two or more races (15.9 percent). The proportion of Hispanic residents in the Lahaina CCD was 11.7 percent. The percentage of minority residents in the Lahaina CCD was 62.2 percent.

The number of housing units in the Lahaina CCD was 11,928. Vacancy rates were relatively high, with a percentage of vacant housing of 35.0 percent. Owner-occupied homes were also relatively low, at 47.3 percent of all homes currently occupied.

The median household income in the Lahaina CCD was $62,434, while per capita income was $33,723. While the median household income was lower than the state of Hawai‘i as a whole, per capita income was slightly higher. The proportion of low-income residents in the Lahaina CCD was 8.3 percent. This percentage is lower than that for the state of Hawai‘i as a whole. The percentage of people unemployed in the Lahaina CCD was 6.1 percent. With regard to people employed in construction occupations, the proportion in the Lahaina CCD was 9.0 percent.

Within the Maui-Kapalua landing site area, there is one school, Kapalua Preschool, and two parks, the D.T. Fleming Beach Park and Kapalua Bay Beach.

For a summary on the character and social values held by residents, please refer to the Maui-Kahului Harbor specific discussion.

State Waters

As shown in Table 3.13-14, the waters around the Maui-Kahului Harbor landing site area are of relatively low importance for commercial catches of all species groups. During the 2007–2011

period, these waters, represented by Fish Catch Area 301, accounted for an average of 2 percent or less of the study area annual commercial catches.

The Honolua-Mokuleia Marine Life Conservation District, which was established in 1978, is completely closed to fishing (HDAR 2012c). The fact that this marine protected area has a higher fish biomass, more large-sized fish, and a greater number of species compared with areas open to fishing along the West Maui coast suggests that fishing pressure is having an adverse impact on coral reef fish populations in areas of West Maui (Friedlander and Brown 2008). Boat fishing along the West Maui coast is limited by the absence of harbor facilities in West Maui. The nearest harbor is about an hour away from Mokuleʻia Bay by boat (Sportfish Hawaiʻi 2012a).

A public access site (D.T. Fleming Park) exists on Honokahua Bay, but the popularity of the beach along the bay among swimmers, bodyboarders, and surfers likely makes fishing in the area difficult. Hāwea Point is a good place to catch reef fish, as is Nāmalu Bay, the small cove on the southern end of point. The cove is also an area where seaweed is gathered (Smith 2007).

Lānaʻi

Western Lānaʻi

Terrestrial

The Lānaʻi landing site area is along the northwest end of Lānaʻi, between approximately 5 and 10 miles away from the community of Lānaʻi City, depending on the location on the shore. As stated above, the CCD in which the landing site area is located is the Lānaʻi CCD. Since the Lānaʻi CCD is the only CCD present for the island, the demographic and socioeconomic indicators presented in the general (i.e., islandwide) discussion above is the same for this specific landing site area (see Figure 3.14-15).

There are no schools or parks within the Lānaʻi landing site area.

Almost all of the residents of Lānaʻi live in Lānaʻi City with resort development secluded to only two areas of the island. Economic diversification is high on the community's agenda because the local economy is dominated by Castle and Cooke, Inc., which owns nearly 98 percent of the island. Additionally, lack of employment opportunities is often the cause of youth leaving the island, putting a strain on traditionally highly valued and strong familial support structures. The Lānaʻi Community Plan (1998) describes a rural community atmosphere that favors the ʻohana attitude, which serves to integrate community members by creating a supportive network of neighbors and residents. Despite the ʻohana attitude, there are fears that long-term residents,

foreign immigrants, and new residents are not fully integrating and that community harmony could be stronger.

State Waters

As shown in Table 3.13-15, the waters around the Lānaʻi landing site area are particularly important for commercial catches of deepwater bottomfish. During the 2007–2011 period, these waters, represented by Fish Catch Areas 308 and 309, accounted for an average of 15 percent of the study area annual commercial catch of deepwater bottomfish. Most of this harvest occurs off the leeward side of the island in Fish Catch Area 308. In addition, the relatively shallow platform bordered by Lānaʻi, Molokaʻi and Maui, represented by Fish Catch Area 321, is a productive area for deepwater bottomfish fishing, accounting for an average of 8 percent of the study area annual commercial catch of these species.

Lānaʻi has a very small resident population and, as a result, coastal areas there are exposed to fairly low fishing pressure in comparison to most other Main Hawaiian Islands. With the exception of the state harbor at Manele Bay, Lānaʻi's entire coastline above the vegetation zone is private property (Smith 1993). This nearly complete privatization of the island has afforded a source of unity and a buffer of sorts to the changes of time, so that local residents have maintained their cultural memory of traditional fisheries conservation. The result is that many inshore fishery resources are still available for them (Lowe 2004).

Molokaʻi

Molokaʻi-Kaluakoi (West Molokaʻi)

Terrestrial

The Molokaʻi-Kaluakoi landing site area is along the western edge of Molokaʻi and is approximately 5 miles west of the community of Maunaloa. As stated above, the CCD in which the landing site area is located is West Molokaʻi (see Figure 3.13-16).

The total population for the West Molokaʻi CCD was 2,752. Approximately 30.6 percent of the population in the West Molokaʻi CCD was under the age of 18, which was a higher percentage than that for the island of Molokaʻi and for the state as a whole. The racial group with the highest percentage of residents in the West Molokaʻi CCD was those who identified as two or more races (45.1 percent). Native Hawaiians had the second largest proportion (28.2 percent), followed by those who identified as White (14.0 percent). The proportion of Hispanic residents in the West Molokaʻi CCD was 7.8 percent. The percentage of minority residents in the West Molokaʻi CCD was 86.2 percent.

The number of housing units in the West Molokaʻi CCD was 1,443. Vacancy rates were relatively high, with a percentage of vacant housing of 41.6 percent. Owner-occupied homes were similar to other areas in Hawaiʻi, at 67.6 percent of all homes currently occupied.

The median household income in the West Molokaʻi CCD was $40,332, while the per capita income was $18,281. Both of these values were lower than the state of Hawaiʻi as a whole. The proportion of low-income residents in the West Molokaʻi CCD was 20.1 percent. This percentage is higher than that for the state of Hawaiʻi as a whole. The percentage of people unemployed in the West Molokaʻi CCD was 8.7 percent. With regard to people employed in construction occupations, the proportion in the West Molokaʻi CCD was 9.4 percent.

There are no schools or parks within the West Molokaʻi landing site area.

The most significant problem for the residents of Molokaʻi is a lack of economic opportunity. Molokaʻi island residents have also identified a lack of involvement and control in decisions that affect their community on the state, county, and community planning levels. Residents cannot drive to the county seat of Maui to participate in planning and decision-making processes. Molokaʻi community policies aim to increase involvement and coordination on an interregional level with the state and county. Development is taken slowly and cautiously on the island; residents do not want to change the rural community lifestyle, which is rich in community celebrations and neighborly altruism. Residents value the undeveloped nature of the island and see undeveloped open space, the environment, and cultural resources as assets to be protected.

State Waters

As shown in Table 3.13-16, the waters around the Molokaʻi-Kaluakoi landing site area are particularly important for commercial catches of deepwater bottomfish. During the 2007–2011 period, these waters, represented by Fish Catch Area 311, accounted for an average of 4 percent of the study area annual commercial catch of deepwater bottomfish. Farther offshore from the Molokaʻi-Kaluakoi landing site area lies Penguin Bank, which is the most extensive shallow shelf area in the Hawaiian Islands. The broad shelf and channels offer extensive access to productive fisheries for deepwater bottomfish and Kona crab (Lowe 2004). During the 2007–2011 period, Penguin Bank, represented by Fish Catch Area 331, accounted for an average of 32 percent and 80 percent of the study area annual commercial catch of deepwater bottomfish and crustacean species, respectively.

The broad inshore areas of Penguin Bank from ʻIlio Point to Laʻau Point also support productive recreational and subsistence fisheries (Sportfish Hawaiʻi 2012b). Local residents speak of the nearshore waters along Molokaʻi's west and south coasts as their "icebox"; it is the place where fishermen usually go to get fish, ʻaʻama crab, and opihi for gathering of their large extended families. Due to the seasonal ocean swells, the south shore is usually harvested in the winter

when there are north swells, and the west shore is usually harvested in the summer when there are south swells (Molokaʻi Properties Limited 2008).

With fewer inhabitants and a closer adherence to traditional fishing methods than is seen on more populated islands, Molokaʻi has fewer problems from overfishing of inshore habitats (Smith 1993). Moreover, although increasing vessel capabilities, gear efficiencies, and other modern developments have had an impact on Molokaʻi's fisheries, local residents have taken action to conserve limited inshore resources (Lowe 2004). However, some Molokaʻi fishermen have expressed concern about the impact of fishing by individuals who are not residents of Molokaʻi, particularly fishermen from Oʻahu who fish along the west and south shores of Molokaʻi for commercial purposes. Located about an hour from Oʻahu by boat, Penguin Bank is a favorite fishing ground for Oʻahu-based full-time and part-time commercial fishermen, the latter known locally as the "weekend warriors" (Smith 1993). According to some Molokaʻi residents, the opening of Hale O Lono harbor, a harbor near the Laʻau Point Lighthouse, and the presence of a boat launching point at the Kaluakoi Hotel also contributed to an increase in seasonal harvesting of resources off the west coast by Molokaʻi boaters (Molokaʻi Properties Limited 2008).

Molokaʻi-Kaunakakai (South Molokaʻi)

Terrestrial

The Molokaʻi-Kaunakakai landing site area is along the southern edge of Molokaʻi and is approximately 4 miles west of the community of Kaunakakai. As stated above, the CCDs in which the landing site areas are located in West Molokaʻi and East Molokaʻi. The demographic and socioeconomic characteristics for the West Molokaʻi CCD are presented above; this section will provide information for the East Molokaʻi CCD (see Figure 3.13-17).

The total population for the East Molokaʻi CCD was 4,503. Approximately 24.5 percent of the population in the East Molokaʻi CCD was under the age of 18, which was a lower percentage than that for the island of Molokaʻi, but a high percentage compared to the state as a whole. The racial group with the highest percentage of residents in the East Molokaʻi CCD was those who identified as two or more races (39.2 percent). Native Hawaiians had the second largest proportion (24.5 percent), followed by those who identified as Asian (17.9 percent). The proportion of Hispanic residents in the East Molokaʻi CCD was 6.2 percent. The percentage of minority residents in the East Molokaʻi CCD was 83.4 percent.

The number of housing units in the East Molokaʻi CCD was 2,159. Vacancy rates were lower than what was seen in West Molokaʻi, at 22.6 percent. Owner-occupied homes were slightly less compared to other areas in Hawaiʻi, at 63.0 percent of all homes currently occupied.

The median household income in the East Molokaʻi CCD was $47,886, while the per capita income was $26,264. Both of these values were higher than what was seen in the West Molokaʻi CCD, but were both still lower than the values seen for the state of Hawaiʻi as a whole. The proportion of low-income residents in the East Molokaʻi CCD was 16.7 percent. This percentage was less than the West Molokaʻi CCD, but higher than the state of Hawaiʻi as a whole. The percentage of people unemployed in the East Molokaʻi CCD was 16.7 percent. With regard to people employed in construction occupations, the proportion in the East Molokaʻi CCD was 14.2 percent.

There are no schools or parks within the West Molokaʻi landing site area or the South Molokaʻi landing site area.

For a summary on the character and social values held by residents, please refer to the Molokaʻi-Kaluakoi specific discussion.

State Waters

As shown in Table 3.13-17, the waters around the Molokaʻi–Kaunakakai landing site area are of relatively low importance for commercial catches of all species groups. During the 2007–2011 period, these waters, represented by Fish Catch Area 310, accounted for an average of 1 percent or less of the study area annual commercial catches.

As noted above, the south coast of Molokaʻi is an important recreational and subsistence fishing area for local residents. Bartram (1992 cited in Friedlander and Rodgers 2008) estimates that the subsistence fishery harvest on the broad reef fringing the southern shore of Molokaʻi may be more than four times that of the commercial harvest, and he suggests that it is probably the most productive reef flat for the recreational and subsistence harvest of reef fish and invertebrates in the Main Hawaiian Islands. Major fishing methods employed along the reef tract include spearing and several types of netting (throw, surround, drag, bullpen, gill) (Friedlander and Rodgers 2008). In addition to fish, other marine resources are locally collected for food: crabbing with spotlight or flashlight on rocky shores for ʻaʻama crab is still common; limu species are harvested along the beach and upon inshore flats; and collecting of opihi occurs in rocky shoreline habitats toward the east end of the south shore.

Molokaʻi's south coast is also known for its numerous ancient coastal fishponds, many of which are now either partially or fully submerged (Hawaiʻi Coastal Zone Management Program 1996; Smith 1993). Ka Honua Momona, a nonprofit organization, is restoring two fishponds, Alii and Kalokoeli, a few miles east of Kaunakakai. Ka Honua Momona has recently secured a 35-year lease on both ponds from the Department of Hawaiian Home Lands (Ka Honua Momona, Intl. 2012).

O‘ahu

O‘ahu-MCBH at Kāne‘ohe Bay

Terrestrial

The MCBH at Kāne‘ohe Bay landing site area is along the eastern edge of O‘ahu and is along the coast near the community of Kailua and MCBH-Hawai‘i. As stated above, the CCD in which the landing site area is located is Koolaupoko (see Figure 3.13-18).

The total population for the Koolaupoko CCD was 115,164. Approximately 21.9 percent of the population in the Koolaupoko CCD was under the age of 18, which was a lower percentage than that for the island of O‘ahu and for the state as a whole. The racial group with the highest percentage of residents in the Koolaupoko CCD was White (32.8 percent). Residents who identified as two or more races had the second largest proportion (29.4 percent), followed by those who identified as Asian (25.3 percent). The proportion of Hispanic residents in the Koolaupoko CCD was 8.8 percent. The percentage of minority residents in the Koolaupoko CCD was 69.7 percent.

The number of housing units in the Koolaupoko CCD was 36,894. Vacancy rates were low compared to other areas in Hawai‘i, with a percentage of vacant housing of 4.3 percent. Owner-occupied homes were similar to other areas in Hawai‘i, at 68.0 percent of all homes currently occupied.

The median household income in the Koolaupoko CCD was $85,088, while the per capita income was $32,504. Both of these values were higher than the state of Hawai‘i as a whole. The proportion of low-income residents in the Koolaupoko CCD was 7.3 percent. This percentage is lower than that for the state of Hawai‘i as a whole. The percentage of people unemployed in the Koolaupoko CCD was 4.9 percent. With regard to people employed in the construction occupations, the proportion in the Koolaupoko CCD was 10.8 percent.

Within the O‘ahu-MCBH Hawai‘i landing site area, there are 12 schools: Aikahi Elementary School, Lanikai Elementary School, Kainalu Elementary School, Kailua Intermediate School, Winward Adventist School, Redemption Academy, Saint Anthony School, Little Learners Preschool, A Caring Place Preschool, KCAA Pre-School of Hawai‘i, St. Anthony Parish School, and Kailua Elementary School. There are also five parks within the O‘ahu-MCBH Hawai‘i landing site area: Kailua District Park, Aikahi Community Park, Kailua Beach Park, Kalaheo Park, and Kaelepulu Mini Park.

Located west of the landing site area is the site for the Koolau converter station. One school, Pali View Baptist Preschool, and one park, Ho‘Omaluhia Park can be found within 0.5 mile of the station.

Residents are conscious of the need for controlled growth and development while preserving the natural environment and improving the standard of living for residents. Many of O‘ahu’s policies are designed to gently curtail development and outside land ownership without negatively affecting the local economy or discouraging investment. O‘ahu’s residents value the social and physical character of O‘ahu’s older neighborhoods and seek to preserve cultural resources while developing the city into the center of arts and education in the Pacific.

State Waters

As shown in Table 3.13-18, the waters around the -MCBH at Kāne‘ohe Bay landing site area are particularly important for commercial catches of coral reef (inshore) species. During the 2007–2011 period, these waters, represented by Fish Catch Area 408, accounted for an average of 7 percent of the study area annual commercial catches of coral reef (inshore) species.

Having sustained the largest population in the Hawaiian Islands for more than a century, O‘ahu has experienced the highest levels of fishing pressure (Smith 1993). The high and increasing fishing effort and large number of residents make overfishing a significant problem almost everywhere on O‘ahu. O‘ahu has the lowest catch per unit effort values for any of the Main Hawaiian Islands (Lowe 2004). In spite of the congestion and decreased fishery yields, O‘ahu’s residents can be found fishing from shore at all times of the day and night, especially along the less developed eastern coast. For example, fishermen using light tackle line the eastern shore during summer runs of goatfish and akule (Smith 1993).

While coastal development on O‘ahu’s eastern shoreline is less dense than along the south and western shores, the watersheds of Ko‘olaupoko (from Kāne‘ohe to Waimanalo) have experienced pollution by urban and agricultural runoff, sewage outfalls, septic effluents via groundwater, and military and urban wastewater discharged into streams and inland ponds (Lowe 2004). Recognizing the impacts of this pollution on inshore fishing and other coastal recreational activities, residents of “windward” O‘ahu have implemented management measures to slow growth and manage the impacts of development. The continuing activism of local residents has played a critical role in the success of these measures, which has benefited inshore fisheries (Lowe 2004).

As with many U.S. military bases, public access to MCBH is limited due to security requirements. However, the base operates a limited public fishing program. A recreational fishing permit system is in place at MCBH that allows public access to shoreline fishing at designated sites at MCBH (Shafer et al. 2002). Two hundred 3-month fishing permits are available for nonmilitary individuals. Fishermen who possess a base-issued fishing permit may only fish during the day from designated shorelines and piers: Fuel Pier (Marina Pier), West-side of Marina Cove (Marina Docks), Waterfront Operations T-Pier, and Fort Hase Beach. The

sale or bartering of fish and commercial fishing is prohibited without written permission from the Commanding General (Shafer et al. 2002).

Active duty, retired, and reserve military; MCBH civilian employees and retirees; auxiliary game wardens; and accompanied children under 13 years of age may fish in designated areas 24 hours a day from shoreline or boat at the Fuel Pier (Marina Pier), West-side of Marina Cove (Marina Docks), Fort Hase Beach, North Beach and Pyramid Rock Beach. Fishing boats must remain 200 yards offshore of North Beach and Pyramid Rock Beach. Waterfront Operations T-Pier and Hale Koa Beach may not be fished by boat (Shafer et al. 2002).

Fort Hase Beach supports fishing with diverse gear types that target 2 dozen species. In addition to pole and spear fishing methods, throw nets are used to catch schools of sardines and anchovies. Pole fishing is the only gear type permitted at Waterfront Operations T-Pier, where a diversity of reef and reef-associated species are caught. At the Marina Pier and Marina Docks, pole fishing is used exclusively to catch transient fish species that are only loosely associated with the coral reef. Fishing is a popular recreational activity at MCBH, and the level of harvest may be approaching overfishing (Shafer et al. 2002).

O‘ahu-Pearl Harbor

Terrestrial

The O‘ahu-Pearl Harbor landing site area is along the southern edge of O‘ahu and is along the coast near the communities of Ewa Beach, Iroquois Point, and Honolulu. As stated above, the CCDs in which the landing site area is located are Ewa and Honolulu (see Figure 3.13-19).

The total population for the Ewa CCD was 323,118 and the total population for the Honolulu CCD was 390,738, which were the top two CCDs in terms of total population on the four islands within the study area. Approximately 24.8 percent and 17.9 percent of the populations were under the age of 18 in the CCDs of Ewa and Honolulu, respectively. In terms of race, the two CCDs are relatively similar in that the racial group with the highest percentage of residents in both CCDs was Asian (Ewa: 48.2 percent; Honolulu: 53.7 percent). Residents who identified as two or more races had the second largest proportion in the Ewa CCD (23.3 percent) and the third largest proportion in the Honolulu CCD (16.7 percent). Residents who identified as White had the second largest proportion in the Honolulu CCD (19.5 percent) and the third largest proportion in the Ewa CCD (16.6 percent). The proportion of Hispanic residents in the Ewa CCD was 9.2 percent, which was higher than the percentage of Hispanic residents in Honolulu (5.3 percent). The percentage of minority residents in the Ewa and Honolulu CCDs were 85.1 percent and 81.9 percent, respectively.

The number of housing units in the Ewa CCD was 100,188, while the number of housing units in the Honolulu CCD was 162,848. Vacancy rates for both CCDs were relatively low compared to

other CCDs in the state, at 4.9 percent and 9.2 percent for the Ewa CCD and Honolulu CCD, respectively. Owner-occupied homes were more common in the Ewa CCD (67.5 percent) than in the Honolulu CCD (48.1 percent).

The median household income in the Ewa CCD was $81,599, while the median household income in the Honolulu CCD was less at $60,667. Per capita income was not similarly distributed, however, with the Ewa CCD exhibiting a lower value ($28,314) than the Honolulu CCD ($32,349). In comparison to the state as a whole, the Ewa CCD had a higher median household income and a relatively similar per capita income, while the Honolulu CCD had a lower median household income and a higher per capita income. The proportion of low-income residents in the Ewa CCD was 5.7 percent, while the proportion of low-income residents in the Honolulu CCD was 10.2 percent. The percentage in the Honolulu CCD is higher than that for the state of Hawai‘i as a whole. The percentage of people unemployed in the Ewa CCD was 4.6 percent, which was similar to the percentage of people unemployed in the Honolulu CCD (4.0 percent). With regard to people employed in the construction occupations, the proportions seen in the Ewa and Honolulu CCDs were 11.2 percent and 6.3 percent, respectively.

Within the O‘ahu-Pearl Harbor landing site area area there are 18 schools: Pohukaina School, Voyager Charter School, Murel School, Myron B. Thompson Academy, Iquim School, Cole Academy, Stepping Stones Academy, Kumon Math and Reading Center, Halau Lokahi Public Charter, Puuhale Elementary School, Iroquois Point Elementary School, Iroquois Point Co-Op Preschool, Our Lady of Perpetual Help School, James Campbell High School, Pohakea Head Start, Ewa Beach Elementary School, Ilima Intermediate School, and Blessing from Heaven Preschool. There are also 11 parks within the O‘ahu-Pearl Harbor landing site area: Kaka‘ako Waterfront Park, Kaka‘ako Makai Gateway Park, Mother Waldron Playground, Irwin Park, Walker Park, Aala Park, Kalakaua Recreation Center Playground, Ke‘Ehi Lagoon Park, Ewa Beach Park, Oneula Beach Park, and Ewa Beach Community Park.

Three converter stations are within or near the O‘ahu-Pearl Harbor landing site area. The Waiau converter station, located north of the landing site area, has one school, Pearl City Preschool, and two parks, Blaisdell Park and Neal S. Blaisdell Park within 0.5 mile. The Iwilei converter station, southeast of Irwin Park, has six schools within 0.5 mile: Cole Academy, Iquim School, St. Andrews Priory School, Kawaiaha‘o Church School, Voyager School, and Pohukaina School. The converter station is also near two parks, Irwin and Walker parks, as well as the Hawai‘i Capitol Historic District. The Archer converter station, located on Ward Avenue, has nine schools within 0.5 mile: KCAA Pre-School of Hawai‘i, Redemption Academy, Queen Kaahumanu Elementary School, First Chinese Church Christian Preschool, Word of Life Academy, Kawaiaha‘o Church School, Honolulu Academy of Arts, President William McKinley High School, and the Makiki Christian Church Preschool. The Archer converter station also has four parks within 0.5 mile: Dole Park, Sheridan Community Park, Piikoi-Rycroft Mini Park, and Thomas Square.

For a summary on the character and social values held by residents, please refer to the MCBH at Kāneʻohe Bay landing site specific discussion.

State Waters

As shown in Table 3.13-19, the waters around Oʻahu-Pearl Harbor landing site area are particularly important for commercial catches of coral reef (inshore) species. During the 2007–2011 period, these waters, represented by Fish Catch Areas 400 and 401, accounted for an average of 36 percent of the study area annual commercial catches of coral reef (inshore) species. Most of the fishing effort for these species is concentrated off the southwest coast of Oʻahu, represented by Fish Catch Area 401, as fish congregate in the deep channels of the adjoining reefs.

Many of Hawaiʻi's harbors suffer from water quality problems, and on Oʻahu, Pearl Harbor and Honolulu Harbor are most heavily affected (Lowe 2004). Soil, groundwater, and sediment contamination with metals, organic compounds, and petroleum hydrocarbons has placed Pearl Harbor, the state's largest harbor, on the priority list for environmental cleanup. The pollutants entering the harbor mean that the fish catch from these areas is potentially unsuitable for human consumption (Lowe 2004). In 1998, the Hawaiʻi Department of Health issued an advisory cautioning against the consumption of fish and shellfish harvested from Pearl Harbor. In 2005, the Agency for Toxic Substances and Disease Registry, a federal public health agency of the U.S. Department of Health and Human Services, reviewed and evaluated the levels of contaminants measured in samples of fish and shellfish collected from Pearl Harbor. Based on this review, the agency issued a report supporting the Hawaiʻi Department of Health advisory to avoid eating fish and shellfish from Pearl Harbor (Federal Facilities Assessment Branch 2005).

In addition, access to fishing in Pearl Harbor is limited by military and airport activity (Lowe 2004). For example, the upper regions of the Pearl Harbor lochs provide ideal habitat for nehu, a baitfish used by the aku pole-and-line fleet. Before September 11, 2001, commercial tuna boats were allowed to collect nehu from certain regions of Pearl Harbor. Since that date, commercial fishing in the harbor is not allowed (Federal Facilities Assessment Branch 2005).

Water quality is also poor in Honolulu Harbor, Hawaiʻi's largest commercial deep draft harbor. Pollutants enter the harbor mainly from nonpoint sources; significant levels of copper, zinc, chromium, nickel, lead, chlordane, and dieldrin have been identified (Hawaiʻi Coastal Zone Management Program 1996). In addition, Honolulu Harbor is heavily transited by shipping vessels, ocean liners, fishing boats, and other commercial vessels, most of which use the harbor as their homeport on Oʻahu (Lowe 2004). Some vessels have been found guilty of discharging wastes into Honolulu Harbor (Daranciang 2008; Klein 2007).

Notwithstanding the water quality impacts in Honolulu Harbor, Sand Island, which is located directly offshore from Honolulu Harbor, has a state recreation area that offers shore fishing

(Hawai‘i Division of State Parks 2012). In addition, since 2005, Kai Makana, a nonprofit organization, has been leading an effort to environmentally and culturally restore Mokauea Island, a small island located in the entrance to Honolulu Harbor. Mokauea Island is the site of O‘ahu’s last Hawaiian fishing village, and the goal of the restoration effort is to re-create a traditional Hawaiian subsistence fishing village that will serve as a learning center for both environmental studies and the perpetuation and practice of Hawaiian fishing and seafaring culture (Kai Makana 2012).

Federal Waters

Fishing grounds within federal waters occur in areas around the Maui-Lāna‘i-Moloka‘i complex, including the vast majority of Penguin Bank (WPRFMC 2012). Penguin Bank is a very important fishing ground for fishermen from O‘ahu, Maui, and Moloka‘i. Penguin Bank is the most important deepwater bottomfish fishing ground because it is the largest area of shallow coastal shelf in the Main Hawaiian Islands, and because of its proximity to major population centers. Penguin Bank is especially important for the catch of uku, one of the few bottomfish species available in substantial quantities to Hawai‘i consumers during summer months (NMFS and WPRFMC 2006). In addition, most of the commercial harvest of Kona crab is from Penguin Bank (WPRFMC 2011). About 15 percent of Hawai‘i’s black coral harvest comes from federal waters in the Auau Channel between Lāna‘i and Maui. Beds of pink, gold, and bamboo coral off Makapuu, O‘ahu, are located in federal waters.

BOEM Jurisdiction

No specific resources are present; please see statement for Federal Waters above.

NOAA Jurisdiction

No specific resources are present; please see statement for Federal Waters above.

3.13.5 Potential Impacts of Cable System Implementation

Description of Impact Types

This section includes analysis and discussion of the types of socioeconomic impacts identified in this document. These include impacts to population, housing, economics, and social values. Impacts to commercial fisheries are also addressed. Finally, environmental justice impacts are evaluated in this section.

With regard to socioeonomics, impact thresholds are the following:

- Cause regional population to decrease through displacement, or induce substantial population growth in an area, either directly or indirectly, where "substantial" is an annual average growth rate more than the historical rate identified in existing conditions;
- Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere, where "substantial" is considered 0.5 percent of all housing units in the CCD;
- Cause regional employment to decrease on the whole, or cause a substantial decrease in employment to a specific sector (e.g., commercial fisheries), where "substantial" is considered to be 5.0 percent of all people employed in the sector; or
- Adversely affect widely held social values or adversely affect community character.

With regard to fisheries, as described above, the waters around Hawai'i support diverse and valuable commercial, recreational, and subsistence fisheries. Impacts to fisheries could result from development of the undersea cable component of an interisland renewable energy system that (1) cause changes in the distribution or abundance of fishery resources that reduce the catchability of fish or shellfish, (2) preclude fishermen from accessing viable fishing areas, or (3) cause losses or damage to fishing equipment or vessels.

With regard to environmental justice impacts, CEQ recommends that the following three factors be considered by the environmental justice analysis to determine whether disproportionately high and adverse impacts may accrue to minority or low-income populations:

- Whether there is or would be an impact on the natural or physical environment that significantly and adversely affects a minority population, low-income population, or Indian tribe. Such effects may include ecological, cultural, human health, economic, or social impacts on minority communities, low-income communities, or Indian tribes when those impacts are interrelated to impacts on the natural or physical environment.
- Whether the environmental effects are significant and are or may be having an adverse impact on minority populations, low-income populations, or Indian tribes that appreciably exceeds or is likely to appreciably exceed those on the general population or other appropriate comparison group.
- Whether the environmental effects occur or would occur in a minority population, low-income population, or Indian tribe affected by cumulative or multiple adverse exposures from environmental hazards.

If an impact remains significant after all feasible mitigation is implemented, then the impact is included in the environmental justice analysis, and the equity of the impact across the study area population is determined. Because of the large-scale nature of the program- and potential project-level actions, the environmental justice analysis presented in this document is evaluated at a broader, more regional scale. In instances where the location of the impact could be

described, the demographic characteristics of the surrounding area were assessed to determine whether a minority or low-income population meaningfully greater than the proportion of minority and/or low-income residents in the general population was present. “Meaningfully greater” populations were interpreted to be either 50 percent of the total population of the geographic unit or simply “greater” than any other population group within the surrounding, larger geography (which provides for a more conservative analysis). In instances where the type of impact would be program-level and spread over a large area but would affect a minority or low-income community disproportionately, these impacts were assessed separately from demographic characteristics for any single geographical area.

Population, Housing, and Economics

Population

Increased socioeconomic activity may occur in the immediate four-island area during construction phases. This increased socioeconomic activity is expected to be short term, however, and would likely involve local labor to the maximum extent practicable. The indirect and induced economic impacts would result in additional employment in the region, which may induce a small amount of short-term growth. However, the total number of new jobs created by the short-term construction activities would likely be filled by existing residents and the total number of new residents moving into the study area to fill open employment positions would be negligible. The number of personnel required for operations and maintenance of an interisland cable system is also negligible in terms of socioeconomics impacts, in that it is anticipated that the existing labor force would be utilized to the maximum extent practicable and the number of in-migrants to the region for operations/maintenance employment would be few, if any. As discussed below, the impacts are considered to be beneficial since the labor market will likely remain depressed from the recent recession and its aftermath for some time. Consequently, a population increase exceeding the historical growth rate would not occur.

While it is unknown where land use changes along the landing site area may occur, it is possible that some land use changes may affect population. For example, long-term displacement of commercial or agricultural land uses (even for a small area of approximately 6 acres) may result in job losses, leading some unemployed residents to leave the region in search of better economic opportunity. The creation of new construction jobs has the potential to outweigh any employment losses from the geographically limited changes in commercial and/or agricultural land uses, at least in the short term, however. The effects on regional population levels would be negligible during construction activities and less than significant in the long term after construction-related activities are completed and some current commercial/agricultural lands are displaced for the cable system footprint.

Similarly, it is possible that some long-term displacement of housing may occur, which would affect population. The number of homes displaced by the cable system footprint would be

negligible, however. Vacancy rates throughout the region suggest that the limited number of residents displaced by the cable system would be able to find ample relocation housing in the surrounding area and that population would not be forced out of the region for lack of adequate housing.

The impact to population would be less than significant.

Housing

As stated elsewhere, increased socioeconomic activity may occur in the immediate four-island area during construction phases of the cable system. The increased socioeconomic activity is expected to be short term and involve local labor. Indirect and induced economic impacts would result in additional employment in the region, which may induce a small amount of short-term growth. However, the total number of new jobs created by the short-term construction activities would be filled by existing residents and the total number of new residents coming into the study area to fill open employment positions would be negligible. Thus, the housing demand would not likely increase. The personnel required for operations and maintenance positions is similar, in that it is anticipated that the existing labor force would be utilized and that the number of in-migrants to the region for operations/maintenance positions would be negligible and would not result in a substantial increase in housing demand.

While it is unknown where land use changes along the landing site area may occur, it is possible that some land use changes may affect housing. For example, long-term displacement of commercial or agricultural land uses may result in job losses, leading some unemployed residents to leave the region, ultimately decreasing housing demand. Similarly, it is possible that some long-term displacement of housing stock may occur. It is anticipated that the absolute number of homes displaced by the project footprint would be negligible, however. Vacancy rates throughout the region suggest that there is adequate housing available in the region to meet demand and that the impact to housing would be less than significant.

Economics

Changes in regional economic output and employment were analyzed for construction and operations/maintenance phases of the cable system. The outputs were used to inform the population and housing impact analyses, above. Estimates of the economic impacts were derived from the IMPLAN input-output economic model. The IMPLAN model presents existing economic conditions for the geographic area analyzed (i.e., the state of Hawai‘i) and provides an estimate of the direct, indirect, and induced impacts on the regional economic from the cable system. The IMPLAN model only provides output for the defined study area and assumes some level of “leakage” outside of the study area based on common ratios of domestic and foreign trade. The figures presented here, which should be interpreted as an approximate upper limit to

economic and employment impacts, provide an overall description of the regional economic impacts from the cable system and are not specific to any individual community or CCD.

Construction of the cable system would create a temporary, positive impact on the local economic base and fiscal resources. Construction employment wages and salaries would provide additional income to the area, as would expenditures within the state for construction materials and services. While the exact figures have not been developed, based on anticipated employment figures required for the cable lay, HDD, trenching, grading, and industrial facility construction, as well as existing data for the state of Hawai‘i regarding the common ratio of employment to payroll/capital expenditures, payroll would be approximately $8.3 million annually and capital expenditures on construction materials and equipment would be approximately $22.8 million annually over 24 months.[6]

Project construction is expected to directly create an average of 139 annual full-time employees of 24 months.[7] This direct employment will create both indirect and induced secondary employment in the region. Indirect employment is defined as employment that will be generated by the purchase of goods and services required by the project. Induced employment is defined as employment that will be generated by the purchase of goods and services by businesses that are indirectly supported by the cable system.

Based on the employment, payroll, and capital expenditure assumptions stated above, the total estimated annual beneficial economic impacts from the 24-month construction phase within the state of Hawai‘i would be as follows (rounded values):

- Direct economic output: $24,800,000
- Indirect economic output: $5,400,000
- Induced economic output: $7,900,000
- Total economic impact: $38,100,000

The top 10 industries that would benefit the most in terms of economic output impacts include construction, rental housing, real estate establishments, architectural and engineering services, petroleum refineries, food service, physicians and other medical professionals, banks, wholesale trade businesses, and insurance carriers.

[6] These dollar figures are based on the IMPLAN 2010 data for the State of Hawai‘i. Based on data from the Bureau of Labor Statistics, Bureau of Economic Analysis, the U.S. Census Bureau, other publically available data sources, and proprietary estimation tools, the Minnesota IMPLAN Group includes with its economic model a set of baseline assumptions regarding established economic activity and regional multipliers. In the absence of exact dollar figures, the model can be told to assume payroll and capital expenditure figures for a given action (if employment estimates are provided) based on established trends in the study area (i.e., the State of Hawai‘i). For a more complete discussion of how IMPLAN aggregates data from various sources to establish these baseline assumptions, please see: http://implan.com/V4/index.php?option=com_multicategories&view=article&id=689:implan-data-source-outline&Itemid=14.

[7] This includes: Grading and foundation crew at converter station sites (20), building erection and construction at converter station sites (15), electrical installation at converter station sites (20), cable-laying boat crew (60), HDD drilling crew (12), terrestrial trenching crew (12).

Also, using the assumptions above during the construction phase, the cable system's estimated annual employment creation within the study area would be as follows:

- Direct (project) employment: 139.0
- Indirect employment: 35.7
- Induced employment: 63.2
- Total employment creation: 237.9

This additional employment would result from the cable system's local construction expenditures as well as from spending by local construction workers. This indirect and induced employment is anticipated to be filled without in-migration of new workers, and the increased employment would result in beneficial economic impacts during the construction phase.

Staff needs for operations and maintenance of the converter stations is anticipated to be 34 full-time employees.[8] Maintenance personnel for the cable cannot be directly assessed as it is assumed that the cable, upon installation, would be relatively maintenance-free except in the event of unforeseen damage to the cable. In those instances, economic activity and employment surrounding its repair would be similar to what is described above for construction, except for a much shorter (1 week to 1 month) duration.

The 34 employees would include various technicians, skilled personnel, operators, and engineers. For this analysis, it is estimated that 100 percent of the 34 employees would be hired locally.

Based on the employment estimate and established ratios of employment to payroll and capital expenditures present in the state of Hawai'i, the annual expenditures of the project were assumed to be $16.8 for materials, equipment, and supplies, and $3.7 in payroll annually.

Based on these assumptions, the annual estimated economic impacts from the operation of the converter stations would be as follows (rounded values):

- Direct economic output: $16,800,000
- Indirect economic output: $600,000
- Induced economic output: $2,700,000
- Total economic impact: $20,100,000

Also, using the assumptions above, during the operations and maintenance phase, the cable system's estimated annual employment created within the study area would be as follows:

[8] This includes 24 hours per day operations staff, two personnel per shift, 40 hour work weeks, for four converter stations.

- Direct (project) employment: 33.6
- Indirect employment: 4.5
- Induced employment: 22.2
- Total employment creation: 60.2

This total employment is anticipated to be filled without substantial in-migration of new workers, and the increased employment would result in beneficial economic impacts during the operations and maintenance phase.

Also of significance is the potential of the project to reduce the economic effects (for both residential and commercial customers) of electricity cost fluctuations caused by changes in the price of oil. Since Hawai‘i is highly dependent on oil for electricity generation, changes in oil prices affect Hawai‘i’s electricity prices. Hawai‘i’s electricity prices per kilowatt-hour are currently about three times the national average. In 2011, expenditures for electricity in Hawai‘i were $3,146,959,729 (see Table 3.13-20), with an average price per barrel of fuel oil of $120.23 (Table 3.13-21). Areas served by diesel-fired generation face even higher costs; the price per barrel of diesel fuel used for electricity generation in 2011 was $130.82.

Oil and petroleum product price projections by the Energy Information Administration indicate that fuel oil prices (Table 3.13-22) are expected to increase faster than the rate of inflation, with a growth rate of 3.1% in real dollars (5% in nominal dollars) between 2010 and 2035.

The potential socioeconomic impacts of a continued reliance on petroleum for electricity generation are significant.

To the extent that an interisland undersea cable system could facilitate the delivery of power not linked to the price of oil, and increase the overall efficiency of the energy system, energy costs and economic dislocations caused by oil price volatility could be reduced. A 400 MW cable system utilized at a 40% capacity factor could transmit a quantity of electricity equal to 14% of Hawai‘i’s annual electricity demand.

Commercial, Recreational, and Subsistence Fisheries

Cause changes in the distribution or abundance of fishery resources

The magnitude of impacts on the coral reef fishery during construction and operation of the interisland cable is expected to be minimized by the use of horizontal directional drilling (HDD) for building the cable conduit in the coastal area. HDD would be employed from an upland site down to a depth below the photic zone (area of active hermatypic coral growth). As a result, adverse economic or sociocultural impacts on commercial, recreational, or subsistence fishing activities due to physical changes to inshore and coral reef habitats from cable installation

operations would be minimized. Similarly, the use of HDD from an upland site would avoid impacts to traditional coastal fishing ponds.

The cable-laying vessel used for at-sea installation would have directional positioning, so anchors would not be needed during the entire at-sea portion of the operation. Consequently, no fishery resources would be crushed or injured by anchoring or weighing anchor. In addition, damage to sedentary fishery resources such as precious coral beds could be minimized by aligning the cable route to avoid known locations of these resources.

Cable installation can pose a threat to a FAD or offshore aquaculture facility such as a submerged cage if the cable-laying vessel is not aware of the FAD or aquaculture facility and the cable is set over it. For example, when a FAD line breaks, the buoy is usually lost. Loss of a FAD would have a negative effect on fishermen since the purpose of these buoys is to help fishermen increase catches and reduce the time and fuel spent looking for fish. The risk of damaging FADs could be minimized by aligning the cable route to avoid these buoys.

Preclude fishermen from accessing viable fishing areas

At landings sites at both ends of the submarine cable, the construction of a nearbeach junction box and installation of the transmission cable using surface excavation or a buried conduit to cross the beach may require temporary exclusion from fishing at the landing site area. However, this exclusion, should it occur, would extend over a short period of time (days) and would be localized (over a discrete area) such that effects on fishing activities would be minimal. To minimize interference with fishing activities, notice could be given to fishermen to alert them to cable installation operations.

In addition, potential interference with fishing activities could occur during the at-sea portion of cable installation activities. Due to the low maneuverability of the cable-laying vessel, there would be a buffer of 0.5 to 1 mile around the ship when it is operating. While the establishment of this buffer zone would potentially interfere with fishing activities, this interference would be temporary (a few hours per day that would extend over several days) and localized (over a discrete area) such that effects would be minimal. As the cable vessel and installation activities progress, fishing activities would not be precluded along the entire cable route. Rather, only relatively small areas would not be available for fishing while the cable-laying vessel is in the specific area. As with the nearbeach portion of cable installation operations, interference with fishing activities during the at-sea portion of cable installation operations could be minimized by alerting fishermen to these operations.

No exclusions are proposed along the cable route during normal cable operations, so no interference would occur to commercial, recreational, or subsistence fisheries during this period.

Cause losses or damage to fishing equipment or vessels

Since the cable would be buried down to a depth below the photic zone, it is reasonable to conclude that in fisheries that occur in shallower water, such as the coral reef (inshore) fishery, interactions between fishing gear and the cable would be minimal and snags unlikely even if that gear should come into contact with the bottom.

In addition, the portion of the cable that extends beyond the defined cable corridor endpoint would be buried, so the cable would not result in an entanglement hazard for fishing gear used in deeper water, including gear that contacts the bottom, such as traps used in the deepwater shrimp fishery, nets used in the Kona crab fishery, and hook-and-line gear used in the deepwater bottomfish fishery.

Environmental Justice

Future environmental review documents developed for specific project-level actions can tier from this study for impacts that may affect environmental justice populations, but it is anticipated that most project-level analysis will be necessary at a localized scale as more specific project-level information becomes available. Potentially significant and unavoidable impacts will be identified in environmental review documents for the cable installation itself and will likely include an environmental justice evaluation for resource areas that may have human health, safety, or sociocultural impacts including the following:

- Air quality
- Land use
- Noise
- Transportation
- Aesthetics
- Cultural resources
- Socioeconomics
- Recreation
- Public services
- Hazardous materials

Maui County-O'ahu Routing Specific

Maui

Maui-Kahului Harbor

Terrestrial

The same forces with regard to population and housing impacts would be present in the Maui-Kahului Harbor area, in that population and housing in the landing site area could be affected indirectly through changes in local employment, as well as directly through displacement for the cable system ROW. The risk for displacement is higher for the Maui-Kahului Harbor area in that commercial, industrial, and residential land uses are more dense along this landing site area than other landing site areas. Regardless, it is anticipated that the population and housing impacts would be negligible even at a local level and that the project could be sited to altogether avoid displacement of population and housing stock.

The economic impacts identified above were modeled at the statewide level; however, it is anticipated that some local employment and economic benefits would accrue to the area immediately surrounding the Maui-Kahului Harbor landing site area as it is the major center of population on Maui, and a high number of construction workers and support service personnel are located in the Kahului/Wailuku area.

The people of Maui generally consider their island to be a paradise with different distinct regions, each with a unique character. Along the Maui-Kahului Harbor landing site area, the nature of the community is relatively urbanized and developed, with this area of Central Maui home to primary governmental offices, civic institutions, the primary airport, harbor, community college, and primary business district. It is expected that the localized short-term impacts associated with the construction phase would not introduce any substantial social impacts to the area, as this area of Central Maui regularly experiences construction activity. Under operations, the cable would be essentially invisible and would be just another part of the urbanized landscape of Central Maui and the Kahului area.

As stated above, the area surrounding the Maui-Kahului Harbor landing site area is predominately minority and is considered an environmental justice population. Localized impacts could potentially accrue disproportionately to the minority population in this area depending on the proximity of sensitive receptors and the location/type of displaced land uses (if any). While the area does not exhibit a substantially high proportion of children residents, a number of parks and schools are within the landing site area and those, also, could be disproportionately affected depending on final cable siting. It is too speculative at this point to determine if an environmental justice impact would occur as a result of the cable system in this area; however, subsequent environmental justice evaluations (under EO 12898 and EO 13045)

will be necessary when specific alignments are identified and environmental impacts are analyzed at the project level.

State Waters

With regard to commercial, recreational, and subsistence fisheries, the potential impacts described above for the larger region would be common to multiple routes. No location-specific impacts have been identified.

Maui-Kapalua (West Maui)

Terrestrial

The same forces with regard to population and housing impacts would be present in the Maui-Kapalua landing site area, in that population and housing in the landing site area could be affected indirectly through changes in local employment, as well as directly through displacement for the cable system ROW. The risk for displacement is slightly lower for the Maui-Kapalua landing site area, however, in that commercial, industrial, and residential land uses are not as dense along the coast and that the area is focused more on tourism and resort living. Also, some relatively open agricultural space is available on the north end of the landing site area. It is anticipated that the population and housing impacts would be negligible at a local level and that the project could be sited to altogether avoid displacement of population and housing stock.

The economic impacts identified above were modeled at the statewide level, however, it is anticipated that some local employment and economic benefits would accrue to the area immediately surrounding the Maui-Kapalua landing site area in an indirect manner, as it is a hub of tourism on Maui and is near the residential areas of Kapalua and Napili-Honokowai.

West Maui is less urbanized than Central Maui, with the area dominated by the resort industry and abundant ocean access points. It is expected that the localized short-term impacts associated with the construction phase would be more noticeable in this area than in the Maui-Kahului Harbor landing site area. Social impacts would be exacerbated if the construction impacts impeded the resort industry or otherwise affected beach access or recreation in the area. Under operations, the slight footprint of the cable would be noticeable and would introduce an industrial element to an area known for open spaces, beautiful vistas, and vivid ocean views, creating a slight impact to the character of the immediate area and resulting in an adverse social impact for those residents who value the natural resources of the area.

As stated above, the area surrounding the Maui-Kapalua landing site area is predominately minority and is considered an environmental justice population. Localized impacts could potentially accrue disproportionately to the minority population in this area depending on the

proximity of sensitive receptors and the location/type of displaced land uses (if any). While the area does not exhibit a substantially high proportion of children residents, a school and two parks are within the landing site area and those, also, could be disproportionately affected depending on final cable siting. It is too speculative at this point to determine if an environmental justice impact would occur as a result of the cable system in this area; however, subsequent environmental justice evaluations (under EO 12898 and EO 13045) will be necessary when specific alignments are identified and environmental impacts are analyzed at the project level.

State Waters

With regard to commercial, recreational, and subsistence fisheries, the potential impacts described above for the larger region would be common to multiple routes. No location-specific impacts have been identified.

Lānaʻi

Western Lānaʻi

Terrestrial

The landing site area on Western Lānaʻi is completely uninhabited and, regardless of cable siting, no population or housing impacts would result from displacements. No economic land uses are present, so the forces noted in other areas related to population and housing impacts are completely absent in Western Lānaʻi.

The economic impacts identified above were modeled at the statewide level. However, it is anticipated that some local employment and economic benefits (however minor) would accrue to the residents of Lānaʻi City, east of the landing site area, as it is the major center of population on Lānaʻi and a number of construction workers and support service personnel are located in the Lānaʻi CCD (i.e., Lānaʻi City).

The Western Lānaʻi landing site area is completely uninhabited and the cable would be placed in an area surrounded by highly valued natural environment. It is expected that the localized short-term impacts associated with the construction phase would be more noticeable on Lānaʻi than on Oʻahu or Maui, for example. Social impacts would be adversely affected if substantial environmental degradation or impacts to cultural resources would occur, even if these impacts occurred on private property held by Castle and Cooke. Also, adverse social impacts may result if local labor is not utilized for construction positions, as economic opportunity is constrained on Lānaʻi and the migration of nonlocal workers to Lānaʻi for construction positions may be viewed unfavorably by local residents who value ʻohana. Under operations, the slight footprint of the cable would be noticeable and would introduce an industrial element to an area that is

completely undeveloped, resulting in an adverse social impact for those residents who value the natural resources of the area.

As stated above, the Lānaʻi CCD is predominately minority and is considered an environmental justice population. Localized impacts could potentially accrue disproportionately to the minority population in this area depending on the level and nature of social impacts that would occur as a result of the cable system. It is too speculative at this point to determine if an environmental justice impact would occur as a result of the cable system in this area; however, subsequent environmental justice evaluations (under EO 12898 and EO 13045) will be necessary when specific alignments are identified and environmental impacts are analyzed at the project level.

State Waters

With regard to commercial, recreational, and subsistence fisheries, the potential impacts described above for the larger region would be common to multiple routes. No location-specific impacts have been identified.

Molokaʻi

Molokaʻi-Kaluakoi (West Molokaʻi)

Terrestrial

The landing site area at Molokaʻi-Kaluakoi is almost completely uninhabited (aside from the Ke Nani Kai Resort and a few private residences) and it is unlikely that population or housing impacts would result from displacements. Few economic land uses are present, so the forces noted in other areas related to population and housing impacts are essentially absent in the Molokaʻi-Kaluakoi landing site area.

The economic impacts identified above were modeled at the statewide level; however, it is anticipated that some local employment and economic benefits (however minor) would accrue to the residents of Molokaʻi, as a number of construction workers and support service personnel are located in the on island.

The Molokaʻi-Kaluakoi landing site area is relatively open aside from the nearby resort uses. It is expected that the localized short-term impacts associated with the construction phase would be noticeable in this area to residents and visitors. Social impacts would occur if construction impacts impeded the resort industry or otherwise affected beach access or recreation in the area. Furthermore, social impacts would be adversely affected if substantial environmental degradation or impacts to cultural resources would occur. Adverse social impacts may result if local labor is not utilized for construction positions, as economic opportunity is constrained on Molokaʻi and the migration of nonlocal workers to Molokaʻi for construction positions may be

viewed unfavorably by local residents who already feel alienated from centralized decision-making institutions on Maui. Under operations, the slight footprint of the cable would be noticeable and would introduce an industrial element to an area known for open spaces and ocean views, creating a slight impact to the character of the immediate area and resulting in an adverse social impact for those residents who value the natural resources of the area.

As stated above, the West Molokaʻi CCD is predominately minority, has a high proportion of low-income residents, has a relatively high proportion of residents under the age of 18, and is considered an environmental justice population. Localized impacts could potentially accrue disproportionately to the minority population in this area depending on the level and nature of social impacts that would occur as a result of the cable system. It is too speculative at this point to determine if an environmental justice impact would occur as a result of the cable system in this area; however, subsequent environmental justice evaluations (under EO 12898 and EO 13045) will be necessary when specific alignments are identified and environmental impacts are analyzed at the project level.

State Waters

With regard to commercial, recreational, and subsistence fisheries, the potential impacts described above for the larger region would be common to multiple routes. No location-specific impacts have been identified.

Molokaʻi-Kaunakakai (South Molokaʻi)

Terrestrial

The landing site area at Molokaʻi-Kaunakakai is almost completely uninhabited (aside from Molokaʻi Sea Farms). Regardless of cable siting, no population or housing impacts would result from displacements. Aside from Molokaʻi Sea Farms, no economic land uses are present, so the forces noted in other areas related to population and housing impacts are essentially absent in the Molokaʻi-Kaunakakai landing site area.

The economic impacts identified above were modeled at the statewide level; however, it is anticipated that some local employment and economic benefits (however minor) would accrue to the residents of Molokaʻi, as a number of construction workers and support service personnel are located in the on island.

The Southern Molokaʻi landing site area is almost completely uninhabited and the cable would be placed in an area surrounding by highly valued natural environment. It is expected that the localized short-term impacts associated with the construction phase would be more noticeable on Lānaʻi than on Oʻahu or Maui, for example. Social impacts would be adversely affected if substantial environmental degradation or impacts to cultural resources would occur, even if

these impacts occurred on private property held by Molokaʻi Sea Farms. Furthermore, social impacts would be adversely affected if substantial environmental degradation or impacts to cultural resources would occur. Adverse social impacts may result if local labor is not utilized for construction positions, as economic opportunity is constrained on Molokaʻi and the migration of nonlocal workers to Molokaʻi for construction positions may be viewed unfavorably by local residents who already feel alienated from centralized decision-making institutions on Maui. Under operations, the slight footprint of the cable would be noticeable and would introduce an industrial element to an area known for open spaces and free of industrial development, creating a slight impact to the character of the immediate area and resulting in an adverse social impact for those residents who value the natural resources of the area.

As stated above, the West and South Molokaʻi CCDs are predominately minority, have high proportions of low-income residents, have relatively high proportions of residents under the age of 18, and are considered an environmental justice populations. Localized impacts could potentially accrue disproportionately to the minority population in this area depending on the level and nature of social impacts that would occur as a result of the cable system. It is too speculative at this point to determine if an environmental justice impact would occur as a result of the cable system in this area; however, subsequent environmental justice evaluations (under EO 12898 and EO 13045) will be necessary when specific alignments are identified and environmental impacts are analyzed at the project level.

State Waters

With regard to commercial, recreational, and subsistence fisheries, the potential impacts described above for the larger region would be common to multiple routes. No location-specific impacts have been identified.

<u>Oʻahu</u>

Oʻahu-MCBH at Kāneʻohe Bay

Terrestrial

The same forces with regard to population and housing impacts would be present in the Oʻahu-MCBH Hawaiʻi area, in that population and housing in the landing site area could be affected indirectly through changes in local employment, as well as directly through displacement for the cable system ROW. The risk for displacement is higher for the Oʻahu-MCBH Hawaiʻi area in that commercial, industrial, and residential land uses are more dense along this landing site area than other landing site areas. Regardless, it is anticipated that the population and housing impacts would be negligible even at a local level and that the project could be sited to altogether avoid displacement of population and housing stock.

The economic impacts identified above were modeled at the statewide level; however, it is anticipated that some local employment and economic benefits would accrue to the area immediately surrounding the O‘ahu-MCBH Hawai‘i landing site area as it is a major center of population on O‘ahu and a high number of construction workers and support service personnel are located in the Kailua area.

The people of O‘ahu value the natural beauty of the island but have developed a balance between development and natural resource protection/preservation. Along the O‘ahu-MCBH Hawai‘i landing site area, the nature of the community is relatively urbanized and developed, with this area of eastern O‘ahu home to residential areas and the primary Marine Corps base in the area. It is expected that the localized short-term impacts associated with the construction phase would not introduce any substantial social impacts to the area, as this area of eastern O‘ahu regularly experiences construction activity. Under operations, the cable would be essentially invisible and would be just another part of the (sub)urbanized landscape of eastern O‘ahu and the Kailua area.

As stated above, the area surrounding the O‘ahu-MCBH Hawai‘i landing site area is predominately minority and is considered an environmental justice population. Localized impacts could potentially accrue disproportionately to the minority population in this area depending on the proximity of sensitive receptors and the location/type of displaced land uses (if any). While the area does not exhibit a substantially high proportion of children residents, a number of parks and schools are within the landing site area and near the proposed converter station and those, also, could be disproportionately affected depending on final cable siting and the environmental impacts associated with the converter station. It is too speculative at this point to determine if an environmental justice impact would occur as a result of the cable system in this area; however, subsequent environmental justice evaluations (under EO 12898 and EO 13045) will be necessary when specific alignments are identified and environmental impacts are analyzed at the project level.

State Waters

With regard to commercial, recreational, and subsistence fisheries, the potential impacts described above for the larger region would be common to multiple routes. No location-specific impacts have been identified.

O‘ahu-Pearl Harbor

Terrestrial

The same forces with regard to population and housing impacts would be present in the O‘ahu-Pearl Harbor area, in that population and housing in the landing site area could be affected indirectly through changes in local employment, as well as directly through displacement for the

cable system ROW. The risk for displacement is highest for the O‘ahu-Pearl Harbor area in that commercial, industrial, and residential land uses are more dense along this landing site area than in any other landing site area. Regardless, it is anticipated that the population and housing impacts would be negligible even at a local level and that the project could be sited to altogether avoid displacement of population and housing stock.

The economic impacts identified above were modeled at the statewide level; however, it is anticipated that local employment and economic benefits would accrue in a large part to the area immediately surrounding the O‘ahu-Pearl Harbor landing site area as it is the major center of population on O‘ahu (and in the state of Hawai‘i) and a high number of construction workers and support service personnel are located in the Honolulu (and surrounding) area.

The people of O‘ahu value the natural beauty of the island but have developed a balance between development and natural resource protection/preservation. Along the O‘ahu-Pearl Harbor landing site area, the nature of the community is relatively urbanized and developed, with this area of O‘ahu home to primary governmental offices, civic institutions, the primary airport, harbor, learning institutions, military facilities, primary businesses, tourist amenities, and the primary residential core of the state. It is expected that the localized short-term impacts associated with the construction phase would not introduce any substantial social impacts to the area, as this area of O‘ahu regularly experiences construction activity. Under operations, the cable would be essentially invisible and would be just another part of the urbanized landscape of O‘ahu and the Honolulu area.

As stated above, the area surrounding the O‘ahu-Pearl Harbor landing site area is predominately minority and is considered an environmental justice population. Localized impacts could potentially accrue disproportionately to the minority population in this area depending on the proximity of sensitive receptors and the location/type of displaced land uses (if any). While the area does not exhibit a substantially high proportion of children residents, a number of parks and schools are within the landing site area and near the proposed converter stations and those, also, could be disproportionately affected depending on final cable siting and the environmental impacts associated with the converter stations. It is too speculative at this point to determine if an environmental justice impact would occur as a result of the cable system in this area; however, subsequent environmental justice evaluations (under EO 12898 and EO 13045) will be necessary when specific alignments are identified and environmental impacts are analyzed at the project level.

State Waters

With regard to commercial, recreational, and subsistence fisheries, the potential impacts described above for the larger region would be common to multiple routes. No location-specific impacts have been identified.

Federal Waters

With regard to commercial, recreational, and subsistence fisheries, the potential impacts described above for the larger region with regard to federal waters would be common to multiple routes. No location-specific impacts have been identified.

BOEM Jurisdiction

No specific impacts are present; lease see statement for Federal Waters above.

NOAA Jurisdiction

No specific impacts are present; please see statement for Federal Waters above.

3.13.6 General Siting Criteria and Special Conservation and Construction Measures

General Level Special Conservation and Construction Measures

Population, Housing, Economics, and Community

Population

The magnitude of impacts to population during construction and operations/maintenance of the cable system could be minimized through the implementation of the following CCMs:

SEJ-1 Site the project so as to not displace existing residential or commercial land uses.

SEJ-2 Site the project so as to not create boundaries within communities or otherwise create a physical and/or social barrier to community interaction.

SEJ-3 Where residential/commercial land uses will be displaced, provide detailed analyses of the types of properties to be displaced (including the number of residences/workers affected) and prioritize relocation within the same community whenever feasible.

Housing

The magnitude of impacts to housing during construction and operations/maintenance of the cable system could be minimized through the implementation of the following CCMs:

SEJ-4 Site the project so as to not displace existing residential or commercial land uses.

SEJ-5 Where residential/commercial land uses will be displaced, provide detailed analyses of the types of properties to be displaced and prioritize relocation within the same community whenever feasible.

Economics

The magnitude of impacts to economics during construction and operations/maintenance of the cable system could be minimized through the implementation of the following CCMs:

SEJ-6 Site the project so as to not displace existing residential or commercial land uses.

SEJ-7 Enter into agreements with local Hawaiian labor unions to provide construction/ operations staffing from local communities.

Community

The magnitude of impacts to the social values of the community during construction and operations/maintenance of the cable system could be minimized through the implementation of the following CCMs:

SEJ-8 Enter into agreements with local Hawaiian labor unions to provide construction/ operations staffing from local communities.

SEJ-9 Provide adequate public notice regarding the construction of the cable system, including construction timeline, labor agreements in place, economic benefits, and environmental impacts.

SEJ-10 Implement CCMs related to aesthetics, air quality, noise, and other environmental impacts in all areas, including those areas where sensitive human receptors (e.g., residential land uses, churches, schools, etc.) are not in proximity.

Commercial, Recreational, and Subsistence Fisheries

The magnitude of impacts to commercial fisheries during construction and operations/maintenance of the cable system could be minimized through the implementation of the following CCMs:

SEJ-11 Consult extensively with commercial, recreational, and subsistence fishermen prior to project implementation so that potential conflicts may be avoided. These two-way dialogues would provide fishermen an opportunity to tell applicants where the most heavily fished areas lie, so that these areas may be avoided when cable routes are planned. Such dialogues may be informal, but in some places more formal cable/fishing committees have been established. Similarly, project applicants should consult with operators of commercial offshore aquaculture facilities prior to project implementation so that potential conflicts may be avoided.

SEJ-12 Cable awareness charts would enable fishermen to know the locations of cables and avoid possible conflict before it happens. Project applicants should give fishermen free charts showing cable locations, and mount campaigns to spread the word when new cables are laid. Electronic versions of the cable awareness charts should be downloadable from the internet and should be compatible with most fishermen's navigation software.

SEJ-13 The magnitude of impacts on the coral reef fishery during construction and operation of the interisland transmission cable should be minimized by requiring the project applicant to use horizontal directional drilling (HDD) for building the cable conduit in the coastal area. HDD should be employed from an upland site down to a depth below the photic zone (area of active hermatypic coral growth).

SEJ-14 To minimize interference with fishing activities during installation of a transmission cable, notice should be given to fishermen to alert them to the nearbeach and at-sea phases of cable installation operations.

SEJ-15 The cable route should be aligned to avoid damaging sedentary fishery resources, such as precious coral beds, during cable installation operations. In addition, the cable route should be aligned to minimize the risk of damaging FADs, koa, artificial reefs, and other areas where fish are known to aggregate and which are focal points of fishing.

Environmental Justice

As stated above, it is too speculative to determine if an environmental justice impact would occur as a result of the cable system in any given area. However, the following CCMs should be implemented when specific alignments are identified and environmental impacts are analyzed at the project level:

SEJ-16 Specifically identify the minority, low-income, and child populations potentially affected in a disproportionate manner by human health and safety and/or environmental impacts associated with project-level activities.

SEJ-17 For those areas within the immediate region of the cable system that are considered environmental justice areas, perform targeted, sustained outreach to local residents regarding the project and the project schedule. Information disseminated should include the construction schedule, on-site construction location, any key developments, public meetings, and site tours. Other information should include travel routes of construction-related traffic and impacts to public transit systems, as well as information regarding alternative transportation opportunities and other strategies that may improve transit access and travel times. Finally, information

should include impacts to cultural resources and historic resources, including mitigation measures taken and efforts made with regard to site avoidance. The outreach may take the form of publicly available education materials, local town-hall-style meetings, or direct mail to environmental justice community residents. The materials would be sensitive to all demographic, socioeconomic, and cultural components of the surrounding communities, and materials may need to be developed in multiple languages;

SEJ-18 Make an agreement that ensures the involvement of disadvantaged businesses and local business enterprises during construction to the maximum extent feasible.

Maui County-O'ahu Routing Specific Special Conservation and Construction Measures

Maui

Maui-Kahului Harbor

Terrestrial

With regard to population, housing, economics, social impacts, and environmental justice, the CCMs listed above would be common to the multiple routes. No location-specific measures have been identified.

State Waters

With regard to commercial fisheries, the conservation and construction measure listed above would be common to multiple routes. No location-specific measures have been identified.

Maui-Kapalua (West Maui)

Terrestrial

With regard to population, housing, economics, social impacts, and environmental justice, the CCMs listed above would be common to the multiple routes. No location-specific measures have been identified.

State Waters

With regard to commercial fisheries, the conservation and construction measure listed above would be common to multiple routes. No location-specific measures have been identified.

Lānaʻi

Western Lānaʻi

Terrestrial

With regard to population, housing, economics, social impacts, and environmental justice, the CCMs listed above would be common to the multiple routes. No location-specific measures have been identified.

State Waters

With regard to commercial fisheries, the conservation and construction measure listed above would be common to multiple routes. No location-specific measures have been identified.

Molokaʻi

Molokaʻi-Kaluakoi (West Molokaʻi)

Terrestrial

With regard to population, housing, economics, social impacts, and environmental justice, the CCMs listed above would be common to the multiple routes. No location-specific measures have been identified.

State Waters

With regard to commercial fisheries, the conservation and construction measure listed above would be common to multiple routes. No location-specific measures have been identified.

Molokaʻi-Kaunakakai (South Molokaʻi)

Terrestrial

With regard to population, housing, economics, social impacts, and environmental justice, the CCMs listed above would be common to the multiple routes. No location-specific measures have been identified.

State Waters

With regard to commercial fisheries, the conservation and construction measure listed above would be common to multiple routes. No location-specific measures have been identified.

O‘ahu

O‘ahu-MCBH at Kāne‘ohe Bay

Terrestrial

With regard to population, housing, economics, social impacts, and environmental justice, the CCMs listed above would be common to the multiple routes. No location-specific measures have been identified.

State Waters

With regard to commercial fisheries, the conservation and construction measure listed above would be common to multiple routes. No location-specific measures have been identified.

O‘ahu-Pearl Harbor

Terrestrial

With regard to population, housing, economics, social impacts, and environmental justice, the CCMs listed above would be common to the multiple routes. No location-specific measures have been identified.

State Waters

With regard to commercial fisheries, the conservation and construction measure listed above would be common to multiple routes. No location-specific measures have been identified.

Federal Waters

With regard to commercial fisheries, the conservation and construction measure listed above would be common to multiple routes. No location-specific measures have been identified.

BOEM Jurisdiction

No specific conservation and construction measures would be needed; please see statement for Federal Waters above.

NOAA Jurisdiction

No specific conservation and construction measures would be needed; please see statement for Federal Waters above.

Table 3.13-1. Major Communities by Island and CCD

Island	CCD	Community
Lānaʻi	Lānaʻi	Lānaʻi City
Maui	Haiku-Pauwela	Haiku-Pauwela
	Hana	Hana
	Kahului	Kahului
	Kihei	Kihei
		Maalaea
	Kula	Kula
		Wailea-Makena
	Lahaina	Kapalua
		Lahaina
		Napili-Honokowai
	Makawao-Paia	Haliimaile
		Paia
		Pukalani
	Puunene	Puunene
	Spreckelsville	--
	Waihee-Waikapu	Waihee-Waiehu
		Waikapu
	Wailuku	Wailuku
Molokaʻi	East Molokaʻi	Kaunakakai
	Kalawao	Kalaupapa
	West Molokaʻi	Hoolehua
		Maunaloa
Oʻahu	Ewa	Aiea
		Ewa Beach
		Hikam Air Force Base
		Kapolei
		Miliani
		Pearl City
		Waimalu
		Waipahu
	Honolulu	Honolulu
		Waikiki
	Koolauloa	Hauula
		Kaaawa
		Kahuku
		Kawela Bay
		Laie
		Pupukea
	Koolaupoko	Kahaluu
		Kailua
		Kāneʻohe
		MCBH at Kāneʻohe Bay
		Maunawili
		Waimanalo
	Wahiawa	Wahaiawa
	Waialua	Waialua
	Waianae	Maili
		Makaha
		Nanakuli

Source: U.S. Census Bureau 2010

Table 3.13-2. Total Population and Average Annual Growth Rates, 1990–2010

	Lānaʻi		Maui		Molokaʻi		Oʻahu		Remainder of Hawaiʻi		Hawaiʻi	
1990	2,426	0.2%	93,787	8.5%	6,717	0.6%	836,231	75.5%	169,068	15.3%	1,108,229	100.0%
2000	3,193	0.3%	117,644	9.7%	7,404	0.6%	876,156	72.3%	207,140	17.1%	1,211,537	100.0%
2010	3,135	0.2%	144,444	10.6%	7,345	0.5%	953,207	70.1%	252,170	18.5%	1,360,301	100.0%
Annual Average Growth Rate 1990-2000	3.2%		2.5%		1.0%		0.5%		2.3%		0.9%	
Annual Average Growth Rate 2000-2010	-0.2%		2.3%		-0.1%		0.9%		2.2%		1.2%	
Annual Average Growth Rate 1990-2010	1.5%		2.7%		0.5%		0.7%		2.5%		1.1%	

Source: U.S. Census Bureau 1990, 2000, 2010

Table 3.13-3. Age Breakdown for Major Age Groupings, 2010

	Lānaʻi		Maui		Molokaʻi		Oʻahu		Remainder of Hawaiʻi		Hawaiʻi	
Under 18	813	25.9%	33,058	22.9%	1,944	26.5%	210,500	22.1%	57,503	22.8%	303,818	22.3%
18-34	618	19.7%	30,205	20.9%	1,341	18.3%	232,719	24.4%	50,762	20.1%	315,645	23.2%
35-49	588	18.8%	31,432	21.8%	1,208	16.4%	191,672	20.1%	47,260	18.7%	272,160	20.0%
50-64	642	20.5%	31,601	21.9%	1,645	22.4%	179,826	18.9%	59,826	23.7%	273,540	20.1%
65-84	413	13.2%	15,672	10.8%	1,085	14.8%	116,130	12.2%	31,600	12.5%	164,900	12.1%
85 and Over	61	1.9%	2,476	1.7%	122	1.7%	22,360	2.3%	5,219	2.1%	30,238	2.2%
Total	3,135	100.0%	144,444	100.0%	7,345	100.0%	953,207	100.0%	252,170	100.0%	1,360,301	100.0%

Source: U.S. Census Bureau 2010

Table 3.13-4. Race, Ethnicity, and Total Minority Estimates, 2010

	Lānaʻi		Maui		Molokaʻi		Oʻahu		Remainder of Hawaiʻi		Hawaiʻi	
White	460	14.7%	51,708	35.8%	1,192	16.2%	198,732	20.8%	84,507	33.5%	336,599	24.7%
Black/African-American	5	0.2%	837	0.6%	28	0.4%	19,256	2.0%	1,298	0.5%	21,424	1.6%
American Indian and Alaska Native	2	0.1%	581	0.4%	20	0.3%	2,438	0.3%	1,123	0.4%	4,164	0.3%
Asian	1,745	55.7%	41,719	28.9%	1,138	15.5%	418,410	43.9%	62,066	24.6%	525,078	38.6%
Native Hawaiian/Pacific Islander	205	6.5%	13,967	9.7%	1,923	26.2%	90,878	9.5%	28,449	11.3%	135,422	10.0%
Some Other Race	5	0.2%	3,023	2.1%	24	0.3%	10,457	1.1%	3,476	1.4%	16,985	1.2%
Two or More Races	713	22.7%	32,609	22.6%	3,020	41.1%	213,036	22.3%	71,251	28.3%	320,629	23.6%
Hispanic	254	8.1%	14,960	10.4%	497	6.8%	15,019	1.6%	90,112	35.7%	120,842	8.9%
Total Minority	2,707	86.3%	96,808	67.0%	6,192	84.3%	496,534	52.1%	448,717	177.9%	1,050,958	77.3%
Total Population	3,135	100.0%	144,444	100.0%	7,345	100.0%	953,207	100.0%	252,170	100.0%	1,360,301	100.0%

Source: U.S. Census Bureau 2010

Table 3.13-5. Housing Units, Vacancy, and Tenure, 2010

	Lānaʻi		Maui		Molokaʻi		Oʻahu		Remainder of Hawaiʻi		Hawaiʻi	
Housing Units	1,545	100.0%	65,232	100.0%	3,715	100.0%	336,899	100.0%	112,117	100.0%	519,508	100.0%
Occupied	1,158	75.0%	50,215	77.0%	2,582	69.5%	311,047	92.3%	90,336	80.6%	455,338	87.6%
Owner Occupied	591	38.3%	27,842	42.7%	1,623	43.7%	174,387	51.8%	58,239	51.9%	262,682	50.6%
Renter Occupied	567	36.7%	22,373	34.3%	959	25.8%	136,660	40.6%	32,097	28.6%	192,656	37.1%
Vacant	387	25.0%	15,017	23.0%	1,133	30.5%	25,852	7.7%	21,781	19.4%	64,170	12.4%

Source: U.S. Census Bureau 2010

Table 3.13-6. Median Household Income, Per Capita Income, and Ratio of Earnings Compared to the Poverty Threshold, 2010

	Lānaʻi		Maui		Molokaʻi		Oʻahu		Remainder of Hawaiʻi		Hawaiʻi	
Median Household Income	$63,170		$56,125 - $118,529		$40,332 - $47,886		$49,847 - $85,088		$34,750 - $77,425		$66,420	
Per Capita Income	$21,207		$21,218 - $74,943		$18,281 - $43,308		$17,255 - $32,504		$17,929 - $36,370		$28,882	
Poverty Ratio												
Under .50	52	1.6%	5,560	4.0%	711	9.3%	39,176	4.3%	13,578	5.6%	59,077	4.5%
.50 to .99	42	1.3%	6,210	4.5%	641	8.4%	41,133	4.5%	17,524	7.3%	65,550	5.0%
1.00 to 1.49	423	12.9%	8,897	6.4%	538	7.1%	53,830	5.9%	17,980	7.5%	81,668	6.3%
1.50 to 1.99	514	15.6%	11,592	8.4%	1,550	20.4%	65,363	7.2%	21,255	8.8%	100,274	7.7%
2.00 and Over	2,258	68.7%	105,810	76.6%	4,172	54.8%	709,782	78.1%	170,327	70.8%	992,349	76.4%
Total Low-Income Population	94	2.9%	11,770	8.5%	1,352	17.8%	80,309	8.8%	31,102	12.9%	124,627	9.6%

Source: U.S. Census Bureau 2010

Table 3.13-7. Employment Status, Occupation, Industry of Employment, and Class of Worker, 2010

	Lānaʻi		Maui		Molokaʻi		Oʻahu		Remainder of Hawaiʻi		Hawaiʻi	
Employment Status												
Population 16 years and over	2,480	100.0%	111,333	100.0%	5,868	100.0%	752,343	100.0%	196,263	100.0%	1,068,287	100.0%
In labor force	1,661	67.0%	78,731	70.7%	3,606	61.5%	501,779	66.7%	128,290	65.4%	714,067	66.8%
Civilian labor force	1,651	66.6%	78,484	70.5%	3,602	61.4%	462,843	61.5%	127,889	65.2%	674,469	63.1%
Employed	1,560	62.9%	73,378	65.9%	3,112	53.0%	439,691	58.4%	118,713	60.5%	636,454	59.6%
Unemployed	91	3.7%	5,106	4.6%	490	8.4%	22,884	3.0%	9,121	4.6%	37,692	3.5%
Percent of civilian labor force	5.5%		6.5%		13.6%		4.9%		7.1%		5.6%	
Armed forces	10	0.4%	247	0.2%	4	0.1%	38,936	5.2%	401	0.2%	39,598	3.7%
Not in labor force	819	33.0%	32,602	29.3%	2,262	38.5%	250,564	33.3%	67,973	34.6%	354,220	33.2%
Occupation												
Management and professional	445	28.5%	21,377	29.1%	898	28.9%	153,540	34.9%	34,801	29.3%	211,061	33.2%
Service	596	38.2%	19,607	26.7%	818	26.3%	89,569	20.4%	28,070	23.6%	138,660	21.8%
Sales and office	238	15.3%	18,376	25.0%	697	22.4%	117,347	26.7%	30,254	25.5%	166,912	26.2%
Farming, fishing, and forestry	0	0.0%	885	1.2%	104	3.3%	2,132	0.5%	2,279	1.9%	5,400	0.8%
Construction, extraction, and maintenance	156	10.0%	7,002	9.5%	377	12.1%	40,474	9.2%	13,917	11.7%	61,926	9.7%
Production, transportation, and material moving	125	8.0%	6,131	8.4%	218	7.0%	36,629	8.3%	9,392	7.9%	52,495	8.2%
Industry												
Agriculture, forestry, fishing and hunting, and mining	0	0.0%	1,753	2.4%	249	8.0%	3,364	0.8%	4,880	4.1%	10,246	1.6%
Construction	197	12.6%	6,696	9.1%	352	11.3%	31,742	7.2%	12,734	10.7%	51,721	8.1%
Manufacturing	11	0.7%	2,066	2.8%	37	1.2%	15,324	3.5%	3,040	2.6%	20,478	3.2%
Wholesale trade	0	0.0%	1,505	2.1%	21	0.7%	12,680	2.9%	2,948	2.5%	17,154	2.7%
Retail trade	10	0.6%	9,141	12.5%	337	10.8%	48,811	11.1%	15,357	12.9%	73,656	11.6%
Transportation, warehousing, and utilities	32	2.1%	3,383	4.6%	194	6.2%	26,320	6.0%	5,650	4.8%	35,579	5.6%
Information	20	1.3%	1,032	1.4%	10	0.3%	9,274	2.1%	1,640	1.4%	11,976	1.9%
Finance, insurance, real estate, and rental and leasing	50	3.2%	5,000	6.8%	156	5.0%	31,640	7.2%	6,835	5.8%	43,681	6.9%
Professional, scientific, management, administrative, and waste management	37	2.4%	7,373	10.0%	184	5.9%	44,784	10.2%	10,974	9.2%	63,352	10.0%
Educational, health, and social services	310	19.9%	11,501	15.7%	813	26.1%	95,435	21.7%	21,201	17.9%	129,260	20.3%
Arts, entertainment, recreation, accommodation, and food services	785	50.3%	16,855	23.0%	434	13.9%	59,637	13.6%	21,975	18.5%	99,686	15.7%
Other services (except public administration	29	1.9%	3,461	4.7%	115	3.7%	19,043	4.3%	5,067	4.3%	27,715	4.4%
Public Administration	79	5.1%	3,612	4.9%	210	6.7%	41,637	9.5%	6,412	5.4%	51,950	8.2%
Class of Worker												
Private wage and salary	1,166	74.7%	54,099	73.7%	2,172	69.8%	314,443	71.5%	83,640	70.5%	455,520	71.6%
Government	328	21.0%	10,919	14.9%	726	23.3%	96,178	21.9%	20,385	17.2%	128,536	20.2%
Self-employed	41	2.6%	8,116	11.1%	214	6.9%	28,261	6.4%	14,236	12.0%	50,868	8.0%
Unpaid family	25	1.6%	244	0.3%	0	0.0%	809	0.2%	452	0.4%	1,530	0.2%

Source: U.S. Census Bureau 2010

Table 3.13-8. Statewide Employment and Economic Output, 2010

Industry Description	Employment	Output
Ag, Forestry, Fish & Hunting	14,262.8	$787,563,050
Mining	1,117.8	$227,415,590
Utilities	3,567.2	$1,801,834,854
Construction	41,350.0	$6,427,551,353
Manufacturing	15,619.1	$7,746,158,855
Wholesale Trade	20,554.5	$2,522,702,881
Retail trade	81,966.1	$5,375,638,580
Transportation & Warehousing	26,715.2	$3,925,653,425
Information	11,564.9	$3,165,014,488
Finance & insurance	34,861.7	$6,373,326,241
Real estate & rental	37,917.4	$11,873,233,633
Professional- scientific & tech services	45,336.8	$4,719,820,583
Management of companies	6,656.9	$1,114,660,156
Administrative & waste services	53,671.0	$3,343,083,176
Educational services	18,212.6	$1,053,842,850
Health & social services	72,127.7	$6,786,647,339
Arts- entertainment & recreation	25,223.0	$1,466,733,142
Accommodation & food services	89,100.2	$7,554,914,719
Other services	49,097.1	$3,492,134,369
Government & non NAICs	178,976.7	$21,633,510,408
Total	827,898.5	$101,391,439,692

Source: IMPLAN 2012

Table 3.13-9. Average Annual Quantity of Landings and Number of Fishermen in Hawai‘i’s Commercial Pelagic Species Fishery by Island, 2007–2012

Island	Average Number of Fishermen	Average Pounds Landed
Hawai‘i	711	1,777,797
Maui	213	399,102
Moloka‘i	20	11,499
Lāna‘i	20	9,330
O‘ahu	549	1,345,841
Kauai	194	528,914

Note: Landings and participation in the longline fishery are not included.
Source: HDAR (2012d)

Table 3.13-10. Average Annual Quantity of Landings and Number of Fishermen in Hawai‘i’s Commercial Deepwater Bottomfish Fishery by Island, 2007–2012

Island	Average Number of Fishermen	Average Pounds Landed
Hawai‘i	232	81,233
Maui	139	96,118
Moloka‘i	12	15,323
Lāna‘i	7	3,120
O‘ahu	242	122,316
Kauai	96	45,021

Source: HDAR (2012d)

Table 3.13-11. Average Annual Quantity of Landings and Number of Fishermen in Hawai'i's Commercial Coral Reef (Inshore) Fishery by Island, 2007–2012

Island	Average Number of Fishermen	Average Pounds Landed
Hawai'i	288	274,702
Maui	160	154,810
Moloka'i	16	6,122
Lāna'i	15	2,836
O'ahu	311	663,508
Kauai	104	104,175

Source: HDAR (2012d)

Table 3.13-12. Average Annual Quantity of Landings and Number of Fishermen in Hawai'i's Commercial Crustacean Fishery by Island, 2007–2012

Island	Average Number of Fishermen	Average Pounds Landed
Hawai'i	27	5,779
Maui	18	7,578
Moloka'i	NA	NA
Lāna'i	NA	NA
O'ahu	21	43,547
Kauai	13	2,883

Note: Data are not available for Moloka'i and Lāna'i because of data confidentiality requirements.
Source: HDAR (2012d)

Table 3.13-13. Average Annual Commercial Fish Catch in the Vicinity of the Maui-Kahului Harbor Landing Site Area, 2007–2011

Fishery	Average Catch in Pounds	Average Percent of Study area Catch
Pelagic Species	1,819	<1.0%
Deepwater Bottomfish Species	3,304	1.0%
Coral Reef (Inshore) Species	29,285	13.0%
Crustacean Species	3,621	16.0%

Source: HDAR (2012d)

Table 3.13-14. Average Annual Commercial Fish Catch in the Vicinity of the Maui-Kahului Harbor Landing Site Area, 2007–2011

Fishery	Average Catch in Pounds	Average Percent of Study area Catch
Pelagic Species	610	<1.0%
Deepwater Bottomfish Species	832	<1.0%
Coral Reef (Inshore) Species	5,156	2.0%
Crustacean Species	235	1.0%

Source: HDAR (2012d)

Table 3.13-15. Average Annual Commercial Fish Catch in the Vicinity of the Lānaʻi Landing Site Area, 2007–2011

Fishery	Average Catch in Pounds	Average Percent of Study area Catch
Pelagic Species	7,018	2.0%
Deepwater Bottomfish Species	33,975	15.0%
Coral Reef (Inshore) Species	2,734	1.0%
Crustacean Species	291	1.0%

Source: HDAR (2012d)

Table 3.13-16. Average Annual Commercial Fish Catch in the Vicinity of the Molokaʻi-Kaluakoi Landing Site Area, 2007–2011

Fishery	Average Catch in Pounds	Average Percent of Study area Catch
Pelagic Species	1,146	<1.0%
Deepwater Bottomfish Species	8,040	4.0%
Coral Reef (Inshore) Species	1,488	<1.0%
Crustacean Species	127	<1.0%

Source: HDAR (2012d)

Table 3.13-17. Average Annual Commercial Fish Catch in the Vicinity of the Molokaʻi–Kaunakakai Landing Site Area, 2007–2011

Fishery	Average Catch in Pounds	Average Percent of Study area Catch
Pelagic Species	1,381	<1.0%
Deepwater Bottomfish Species	2,028	1.0%
Coral Reef (Inshore) Species	2,098	1.0%
Crustacean Species	NA	NA

Note: Data are not available for crustacean species because of data confidentiality requirements.
Source: HDAR (2012d)

Table 3.13-18. Average Annual Commercial Fish Catch in the Vicinity of the Oʻahu-MCBH Hawaiʻi (Kāneʻohe) Landing Site Area, 2007–2011

Fishery	Average Catch in Pounds	Average Percent of Study area Catch
Pelagic Species	296	<1.0%
Deepwater Bottomfish Species	1,352	<1.0%
Coral Reef (Inshore) Species	15,559	7.0%
Crustacean Species	NA	NA

Note: Data are not available for crustacean species because of data confidentiality requirements.
Source: HDAR (2012d)

Table 3.13-19. Average Annual Commercial Fish Catch in the Vicinity of the O'ahu-Pearl Harbor Landing Site Area, 2007–2011

Fishery	Average Catch in Pounds	Average Percent of Study area Catch
Pelagic Species	6,045	1.0%
Deepwater Bottomfish Species	6,266	3.0%
Coral Reef (Inshore) Species	78,061	36.0%
Crustacean Species	NA	NA

Note: Data are not available for crustacean species because of data confidentiality requirements.
Source: HDAR (2012d)

Table 3.13-20. Annual Electricity Expenditures, Statewide

	2007	2008	2009	2010	2011
Residential	$772,064,144	$1,002,583,094	$739,415,684	$840,066,308	$1,015,703,245
Commercial	$1,470,232,893	$2,016,045,280	$1,397,724,580	$1,662,266,316	$2,114,648,299
Street Lights	$11,134,426	$15,321,768	$10,982,763	$13,398,667	$16,608,185
Total	$2,253,431,463	$3,033,950,142	$2,148,123,027	$2,515,731,291	$3,146,959,729

Source: DBEDT, Monthly Energy Trends

Table 3.13-21. Price and Cost of Fuels Used for Electricity Generation in Hawaii, 2007–2011

	2007	2008	2009	2010	2011
Average Cost / Bbl of Fuel Oil	$61.25	$108.58	$60.20	$84.70	$120.23
Total Cost of Fuel Oil	$592,057,502	$979,226,945	$519,110,878	$708,006,189	$992,893,712
Cost of Fuel Oil / kWh generated	$0.12	$0.20	$0.12	$0.16	$0.22
Average Cost / Bbl of Diesel Oil	$98.66	$136.08	$77.28	$98.41	$130.82
Total Cost of Diesel Oil	$258,322,817	$348,113,920	$204,811,408	$259,603,832	$337,957,096
Cost of Diesel Oil / kWh generated	$0.21	$0.27	$0.18	$0.25	$0.35
Amount Spent for Fuel Oil + Diesel	$850,380,319	$1,327,340,865	$723,922,286	$967,610,021	$1,330,850,808

Source: DBEDT, Monthly Energy Trends

Table 3.13-22. Petroleum Product Prices, Reference Case

	2015	2020	2025	2030	2035	Growth Rate (2010-2035)
Low Sulfur Light Crude Oil (2010 dollars)	$116.91	$126.68	$132.56	$138.49	$144.98	2.4%
Residual Fuel Oil (2010 dollars)	$144.60	$153.30	$159.70	$160.65	$161.71	3.1%
Low Sulfur Light Crude Oil (nominal dollars)	$125.97	$148.87	$170.09	$197.10	$229.55	4.3%
Residual Fuel Oil (nominal dollars)	$155.82	$180.18	$204.92	$228.65	$256.03	5.0%

Source: EIA, Annual Energy Outlook, 2012

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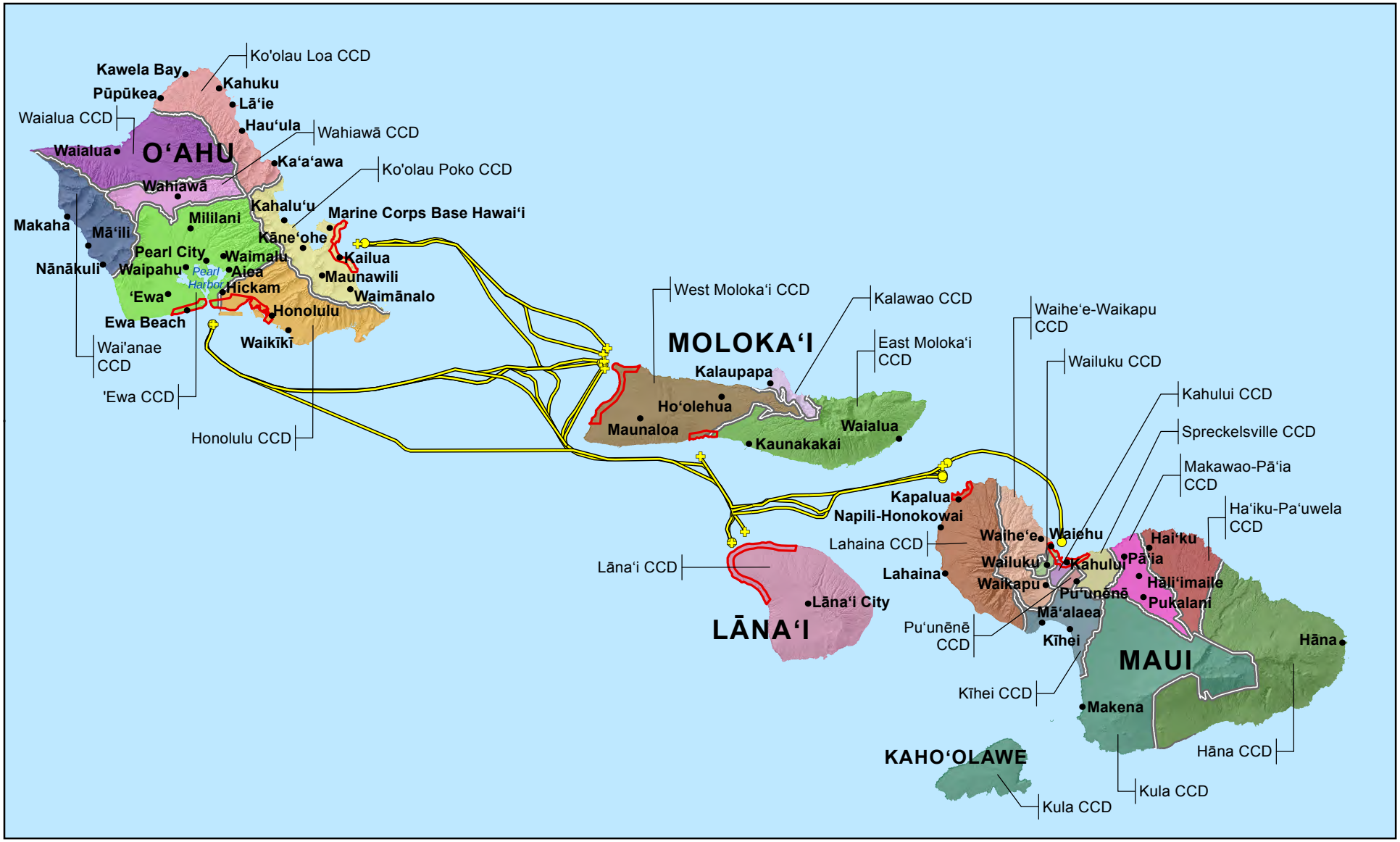


UH-SOEST Surveyed Area Alternatives and 2010 Census

- Route with camera data *
- Route without camera data **
- SOEST Cable Routes
- HIREP Study Analysis Area
- Open Water
- Selected Cities and Communities
- Census County Division Boundaries

2010 Census County Divisions (CCD)

MAUI
- Waihe'e-Waikapu
- Wailuku
- Kahului
- Spreckelsville
- Pu'unēnē
- Lahaina
- Ha'iku-Pa'uwela
- Hāna
- Kīhei

LĀNA'I
- Kula
- Makawao-Pā'ia
- Lāna'i

MOLOKA'I
- East Moloka'i
- West Moloka'i
- Kalawao

O'AHU
- Honolulu
- 'Ewa
- Ko'olau Loa
- Ko'olau Poko
- Wahiawā
- Waialua
- Wai'anae

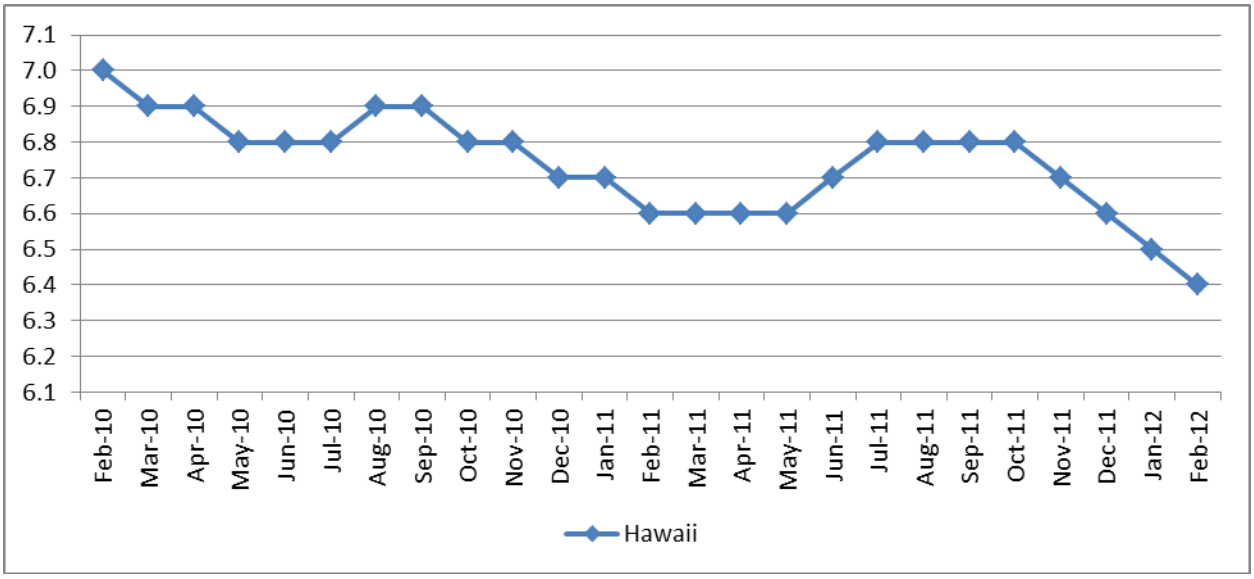
N

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.

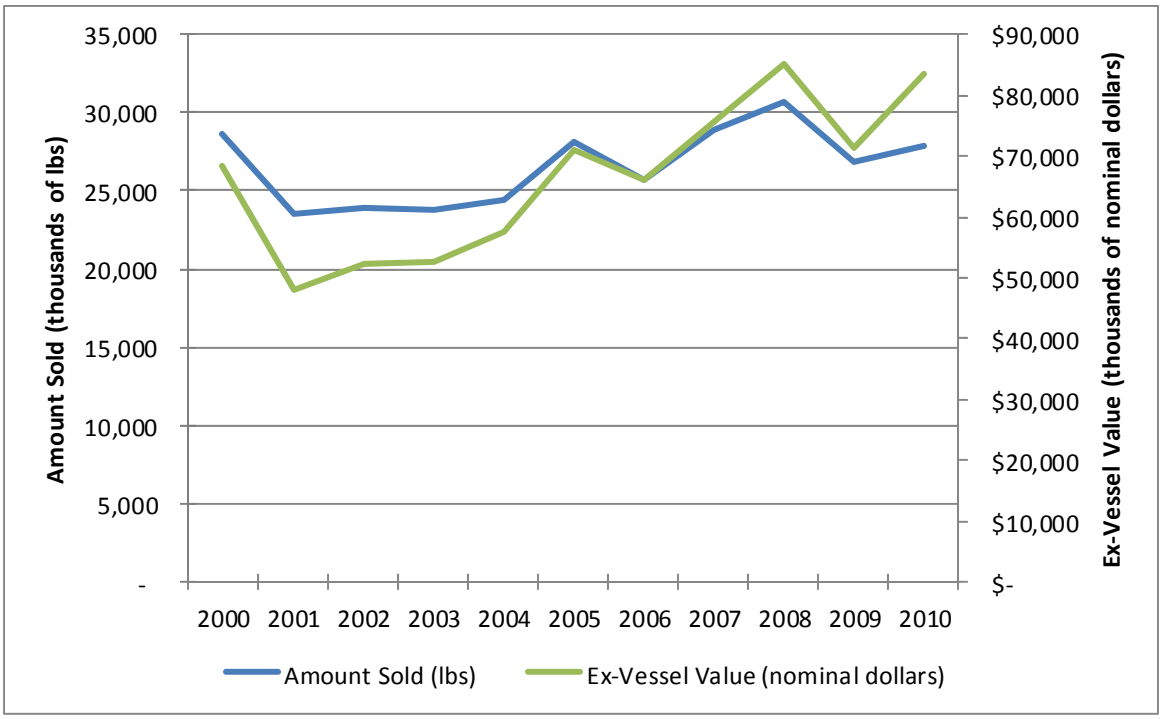
Date: 8/9/2012
Data Sources: HI-DBEDT, USCB, UH-SOEST, AECOM, 2012

Figure 3.13-1



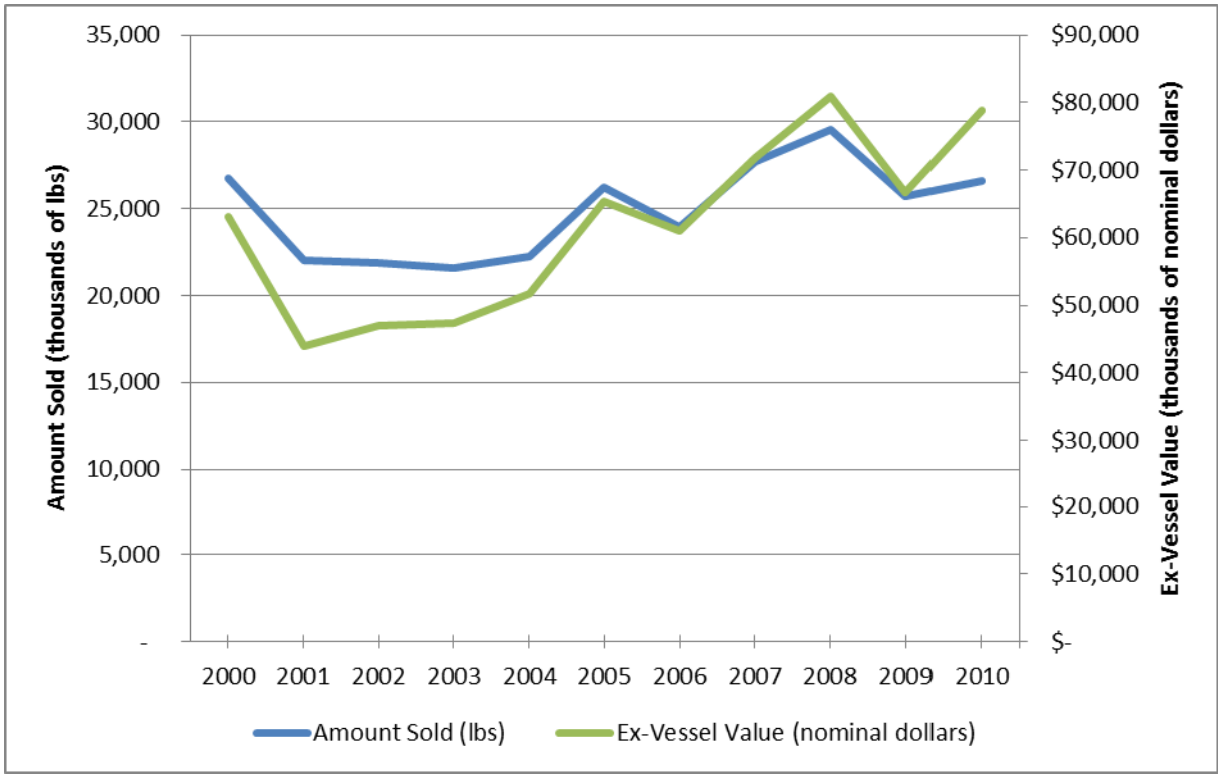
Source: Hawai'i Department of Labor and Industrial Relations 2012.

Figure 3.13-2. State of Hawai'i Seasonally Adjusted Unemployment Rate, February 2010–February 2012



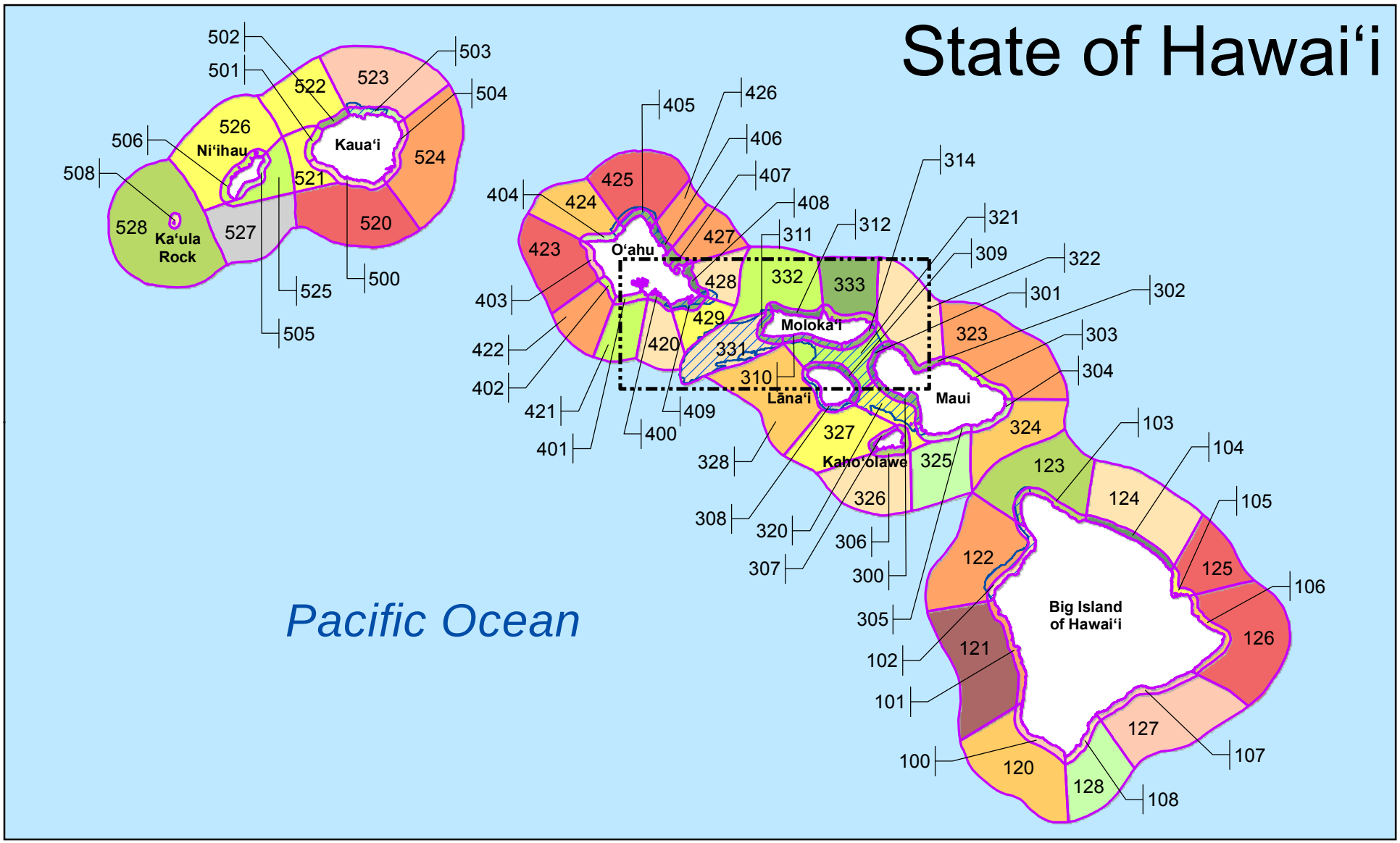
Source: NMFS (2011)

Figure 3.13-3. Annual Quantity and Value of Landings in Hawai‘i’s Commercial Fisheries, 2000–2010



Source: NMFS (2011)

Figure 3.13-4. Annual Quantity and Value of Landings in Hawai‘i’s Commercial Pelagic Species Fishery, 2000–2010


State of Hawai‘i
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Ni‘ihau
Ka‘ula Rock
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Kaho‘olawe
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Commercial Fisheries - Pelagic Species (2007-2011) Average Pounds Caught by Area
HIREP Study Area Limits
Humpback Whale National Marine Sanctuary
HI-DLNR Fish Catch Areas (with Area Codes)
Open Water
Pelagic Fish Species, Pounds per Year *
Yearly Average in Pounds **
less than 1,000 lbs/yr
1,000 - 2,000 lbs/yr
2,500 - 3,500 lbs/yr
3.500 - 5,000 lbs/yr
5,000 - 10,000 lbs/yr
10,000 - 20,000 lbs/yr
20,000 - 30,000 lbs/yr
35,000 - 50,000 lbs/yr
50,000 - 100,000 lbs/yr
100,000 - 200,000 lbs/yr
200,000 - 300,000 lbs/yr
over 600,000 lbs/yr
No Data
N
0
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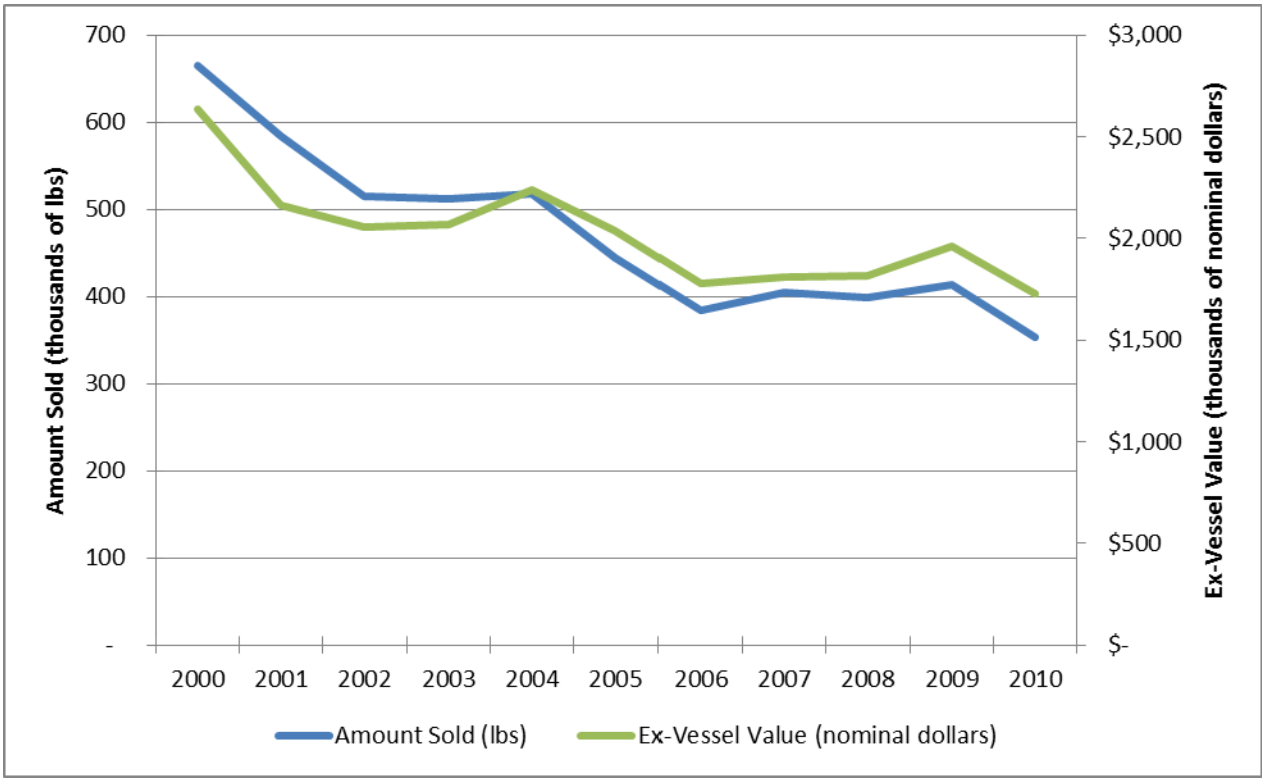
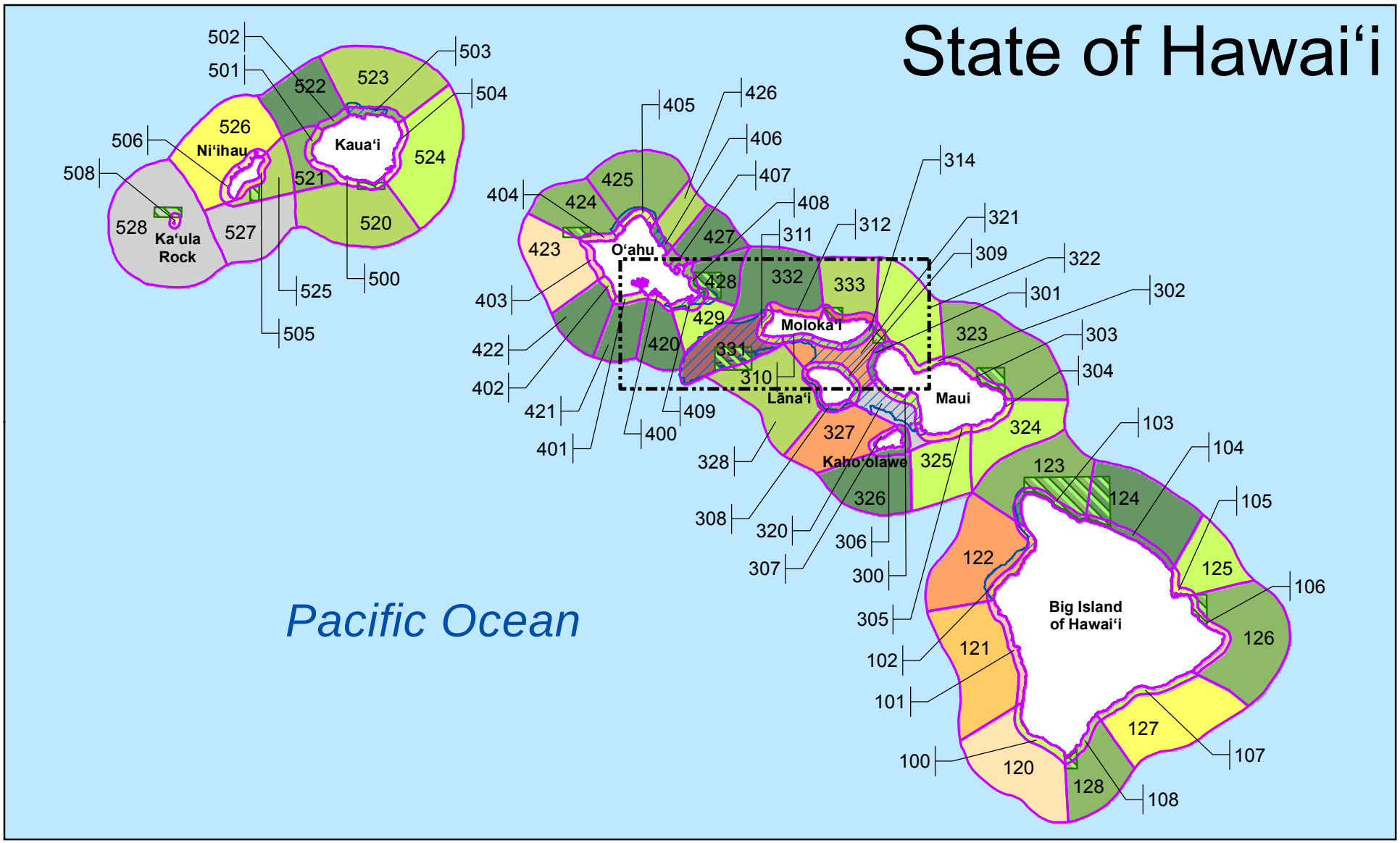
Miles
* Pelagic fish include tuna, wahoo, mahimahi and others.
** Data shown represents a five-year range, unless area data only covered 1-4 years (see table).
This data has been grouped to represent an average range. See table for exact number of pounds caught per fish catch area.
Date: 4/26/2012
Data Sources: HI-DBEDT,HI-DLNR, NOAA, UH-SOEST, AECOM, 2012

Figure 3.13-5



Source: NMFS (2011)

Figure 3.13-6. Annual Quantity and Value of Landings in Hawai‘i’s Commercial Deepwater Bottomfish Fishery, 2000–2010


State of Hawai‘i
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Ni‘ihau
Ka‘ula Rock
O‘ahu
Moloka‘i
Lāna‘i
Maui
Kaho‘olawe
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Commercial Fisheries - Bottomfish Species (2007-2011) Average Pounds Caught by Area
HIREP Study Area Limits
Humpback Whale National Marine Sanctuary
Bottomfish Restricted Fishing Areas (RFAs)
HI-DLNR Fish Catch Areas (with Area Codes)
Open Water
Bottomfish Fish Species, Pounds per Year *
Yearly Average in Pounds **
less than 1,000 lbs/yr
1,000 - 1,500 lbs/yr
1,500 - 2,500 lbs/yr
2,500 - 3,500 lbs/yr
3,500 - 4,500 lbs/yr
4,500 - 5,500 lbs/yr
5,500 - 7,500 lbs/yr
8,000 - 12,000 lbs/yr
15,000 - 20,000 lbs/yr
30,000 - 40,000 lbs/yr
over 65,000 lbs/yr
No Data
N
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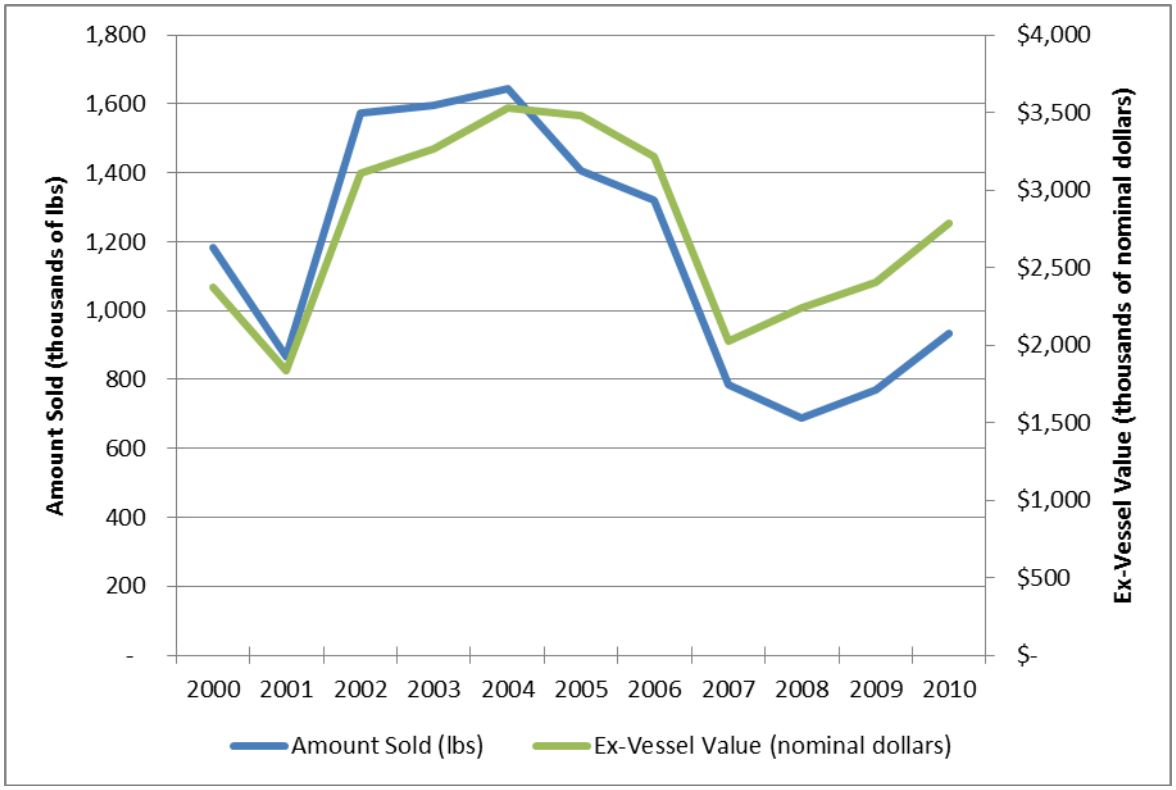
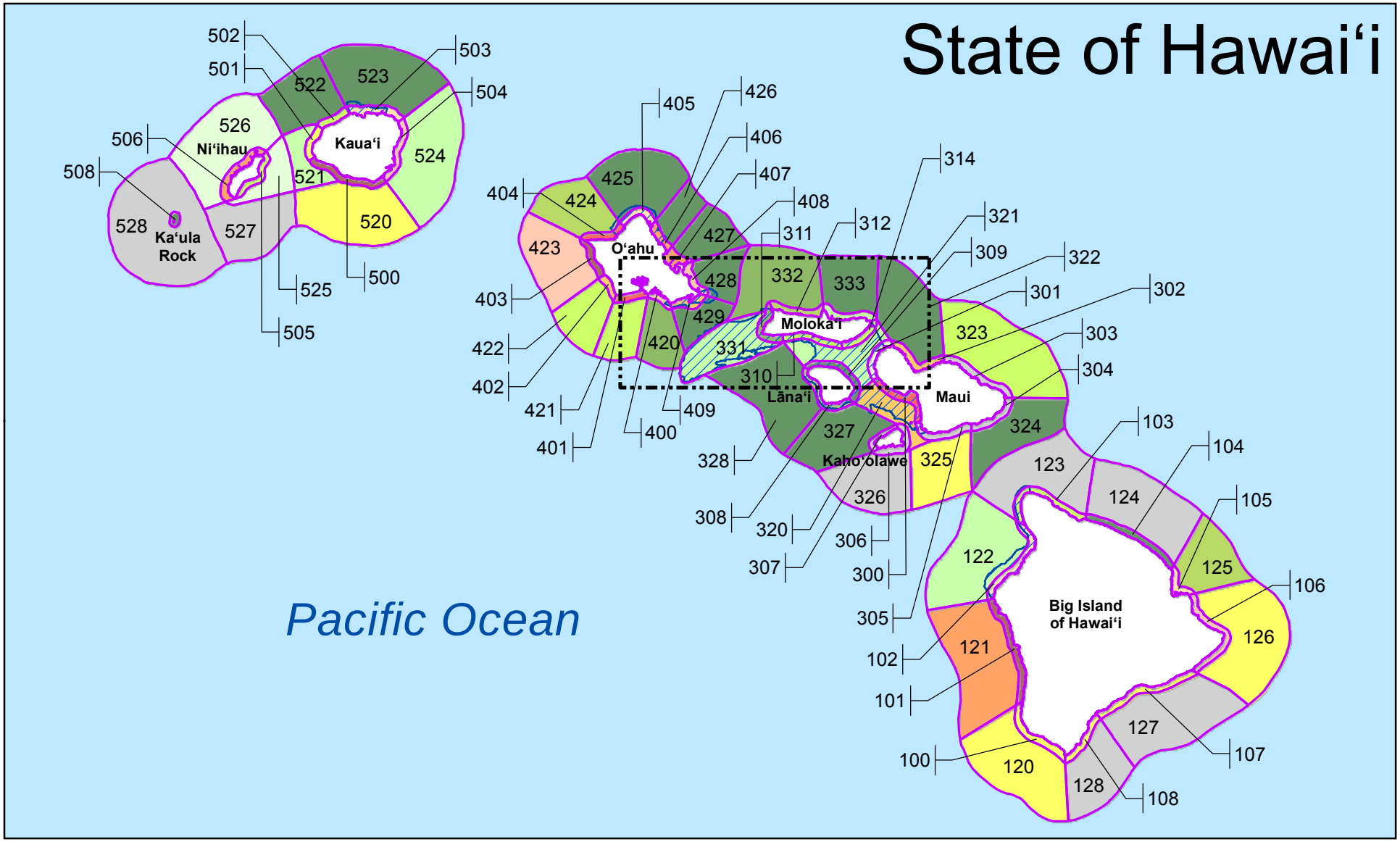
Miles
* Bottomfish include grouper, snapper, jacks, and others.
** Data shown represents a five-year range, unless area data only covered 1-4 years (see table).
This data has been grouped to represent an average range. See table for exact number of pounds caught per fish catch area.
Date: 4/26/2012
Data Sources: HI-DBEDT,HI-DLNR, NOAA, UH-SOEST, AECOM, 2012

Figure 3.13-7



Source: NMFS (2011)

Figure 3.13-8. Annual Quantity and Value of Landings in Hawai‘i’s Commercial Coral Reef (Inshore) Species Fishery, 2000–2010


State of Hawai‘i
Pacific Ocean
Kaua‘i
Ni‘ihau
Ka‘ula Rock
O‘ahu
Moloka‘i
Lāna‘i
Kaho‘olawe
Maui
Big Island of Hawai‘i
502
501
503
504
506
508
526
522
523
524
521
520
528
527
525
500
505
405
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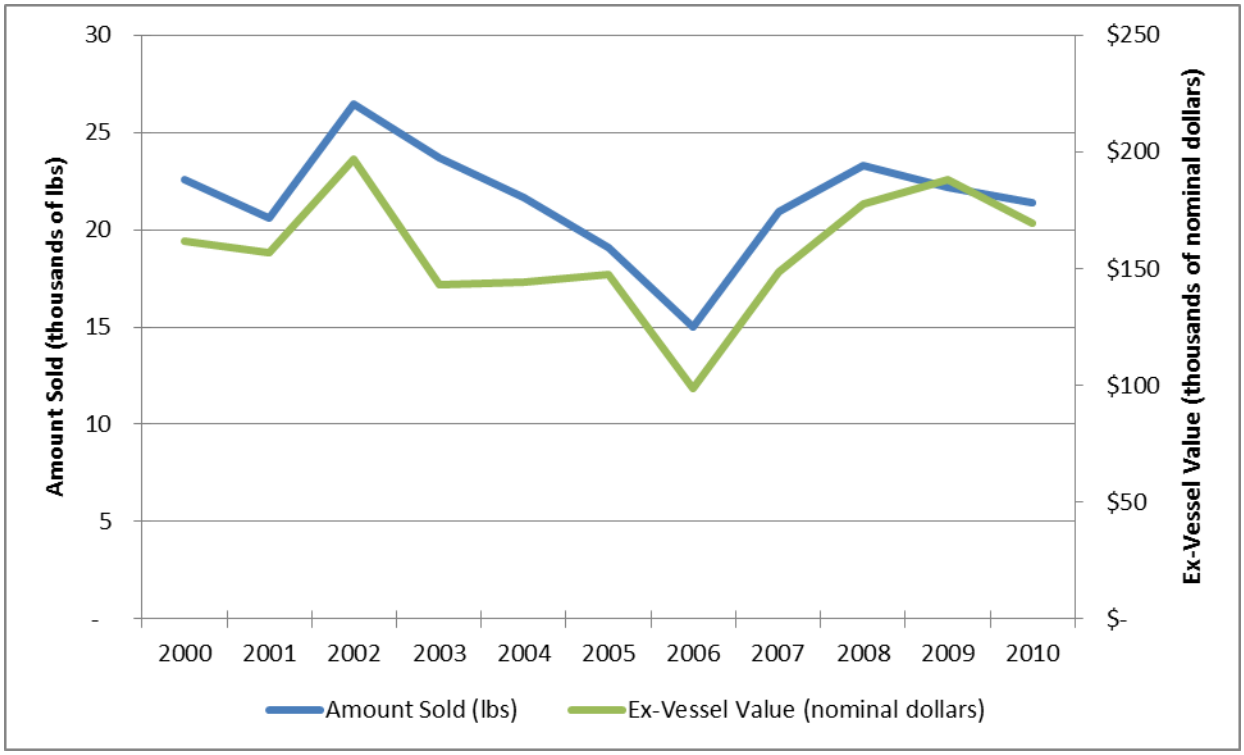
123
124
326
105
308
320
306
307
122
125
300
106
305
126
102
121
101
127
100
120
107
128
108
Commercial Fisheries - Inshore Species (2007-2011) Average Pounds Caught by Area
HIREP Study Area Limits
Humpback Whale National Marine Sanctuary
HI-DLNR Fish Catch Areas (with Area Codes)
Open Water
Inshore Fish Species, Pounds per Year *
Yearly Average in Pounds **
less than 1,000 lbs/yr
1,000 - 1,500 lbs/yr
1,500 - 2,000 lbs/yr
2,000 - 2,500 lbs/yr
2,500 - 3.500 lbs/yr
3,500 - 5,500 lbs/yr
6,000 - 10,000 lbs/yr
12,000 - 15,000 lbs/yr
15,000 - 20,000 lbs/yr
20,000 - 30,000 lbs/yr
30,000 - 50,000 lbs/yr
55,000 - 75,000 lbs/yr
130,000 - 150,000 lbs/yr
No Data
N
0
50
Miles
* Inshore species include bonefish, ulua, triggerfish and others.
** Data shown represents a five-year range, unless area data only covered 1-4 years (see table).
This data has been grouped to represent an average range. See table for exact number of pounds caught per fish catch area.
Date: 4/28/2012
Data Sources: HI-DBEDT,HI-DLNR, NOAA, CCH, UH-SOEST, AECOM, 2012

Figure 3.13-9



Source: NMFS (2011)

Figure 3.13-10. Annual Quantity and Value of Landings in Hawai‘i’s Commercial Crustacean Fishery, 2000–2010

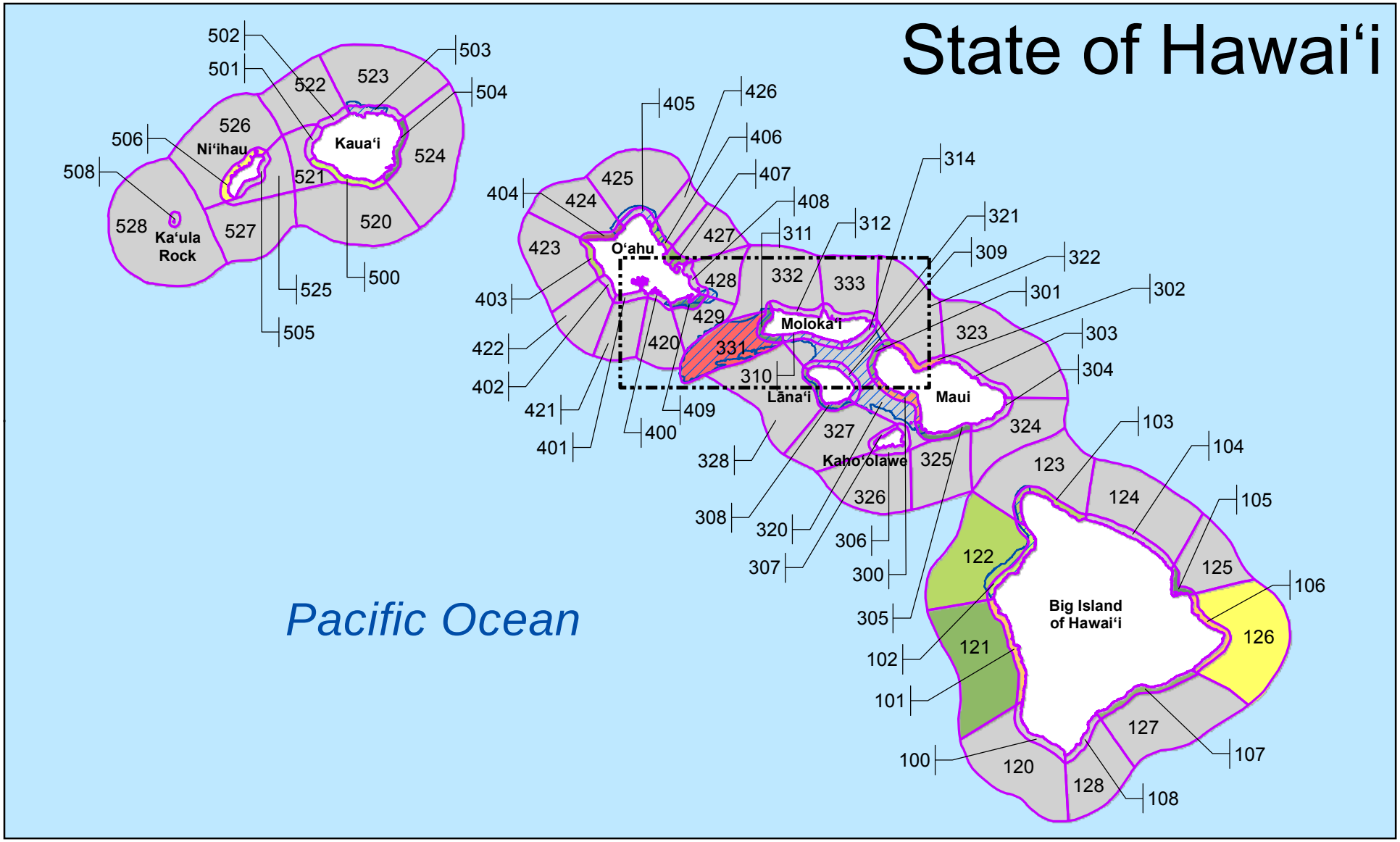
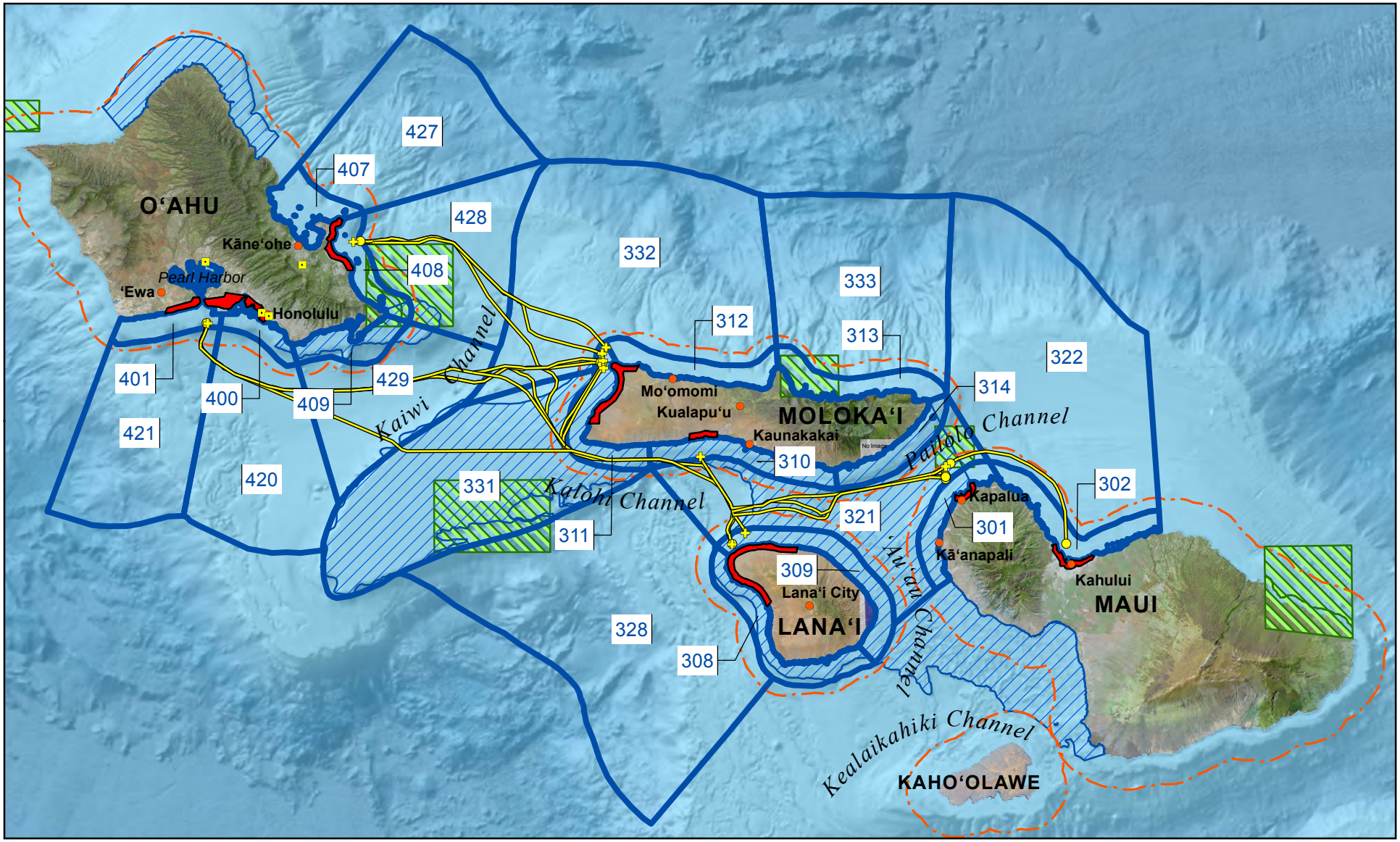


Figure 3.13-11



UH-SOEST Surveyed Areas and Commercial Fisheries Areas

- Route with camera data *
- Route without camera data **
- Identified O‘ahu Substation Locations
- Selected Cities & Communities
- SOEST Cable Routes
- HIREP Study Analysis Area
- State Jurisdictional Waters (3 nautical miles)
- Humpback Whale National Marine Sanctuary
- Relevant HI-DLNR Fish Catch Areas (with Area Codes)
- Bottomfish Restricted Fishing Areas (RFAs)
- Open Water

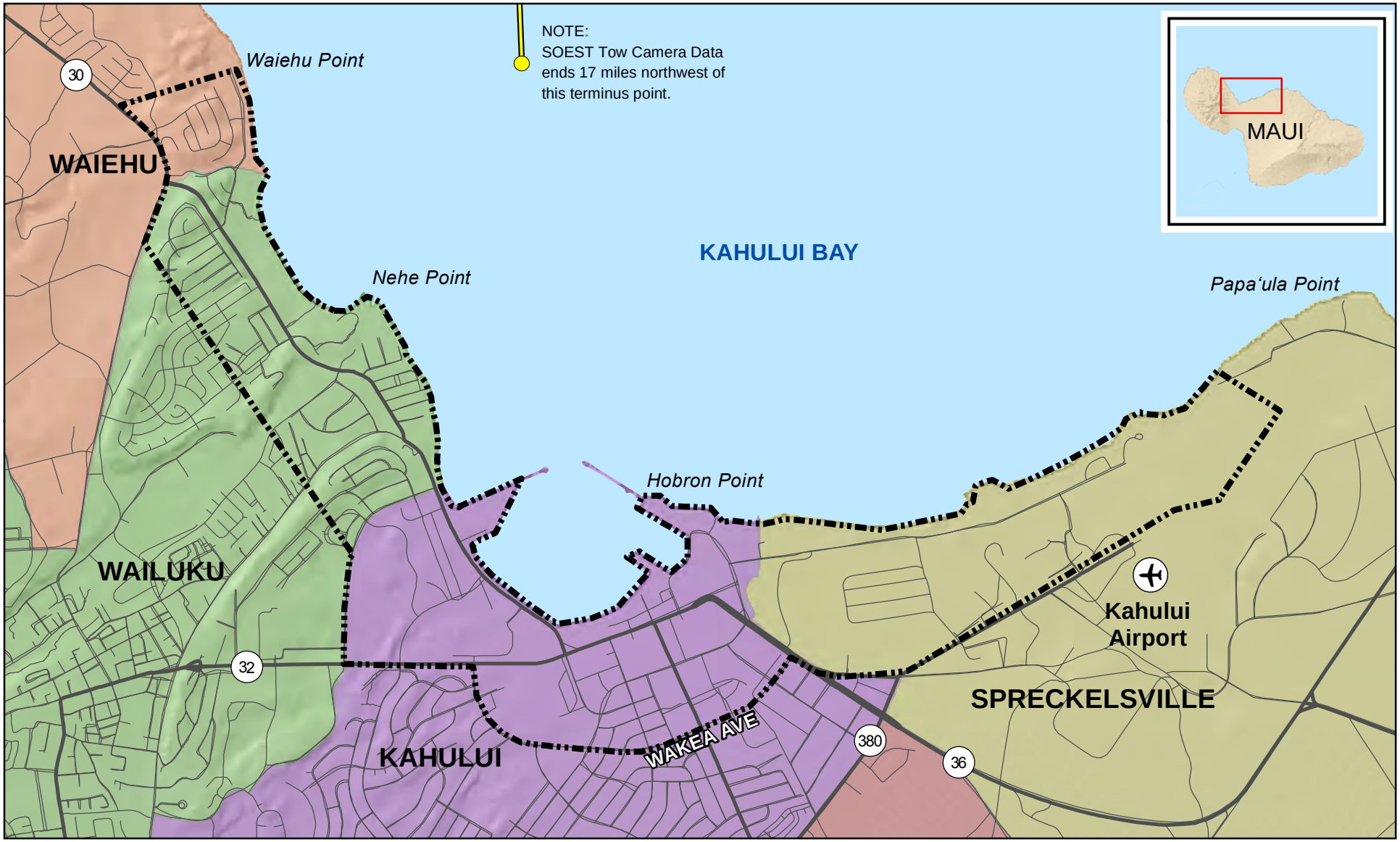
N

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: 8/9/2012
Data Sources: HI-DBEDT,NOAA, HI-DLNR, UH-SOEST, AECOM, 2012

Figure 3.13-12



Kahului Maui Landing Site Area: 2010 Census

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

2010 Census County Divisions (CCD)

- Waihe'e-Waikapu
- Wailuku
- Kahului
- Spreckelsville
- Pu'unēnē

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, USCB, UH-SOEST, AECOM, 2012

Figure 3.13-13

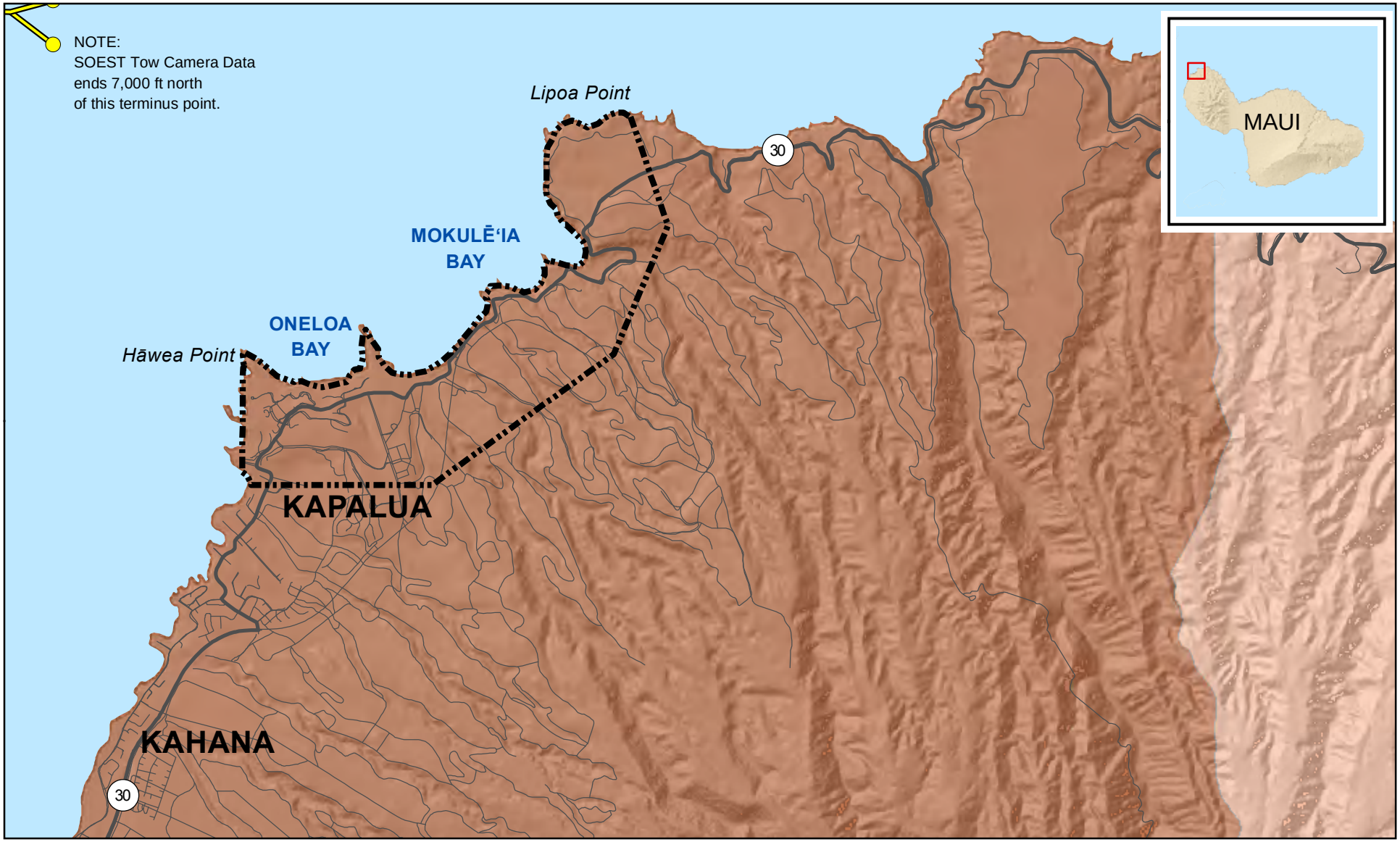
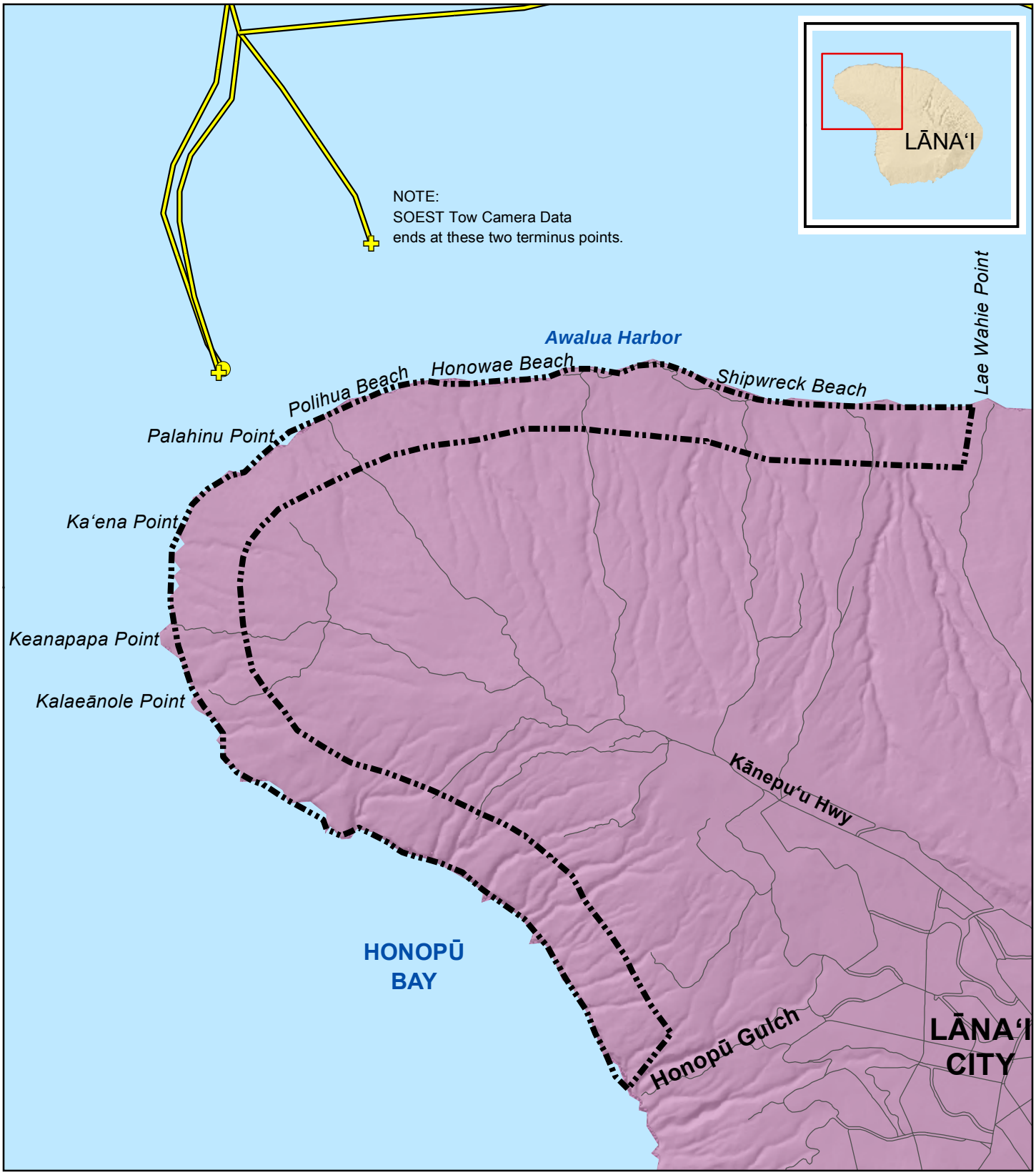


Figure 3.13-14



Lānaʻi Landing Site Area: 2010 Census

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

2010 Census County Divisions (CCD)

- Lānaʻi

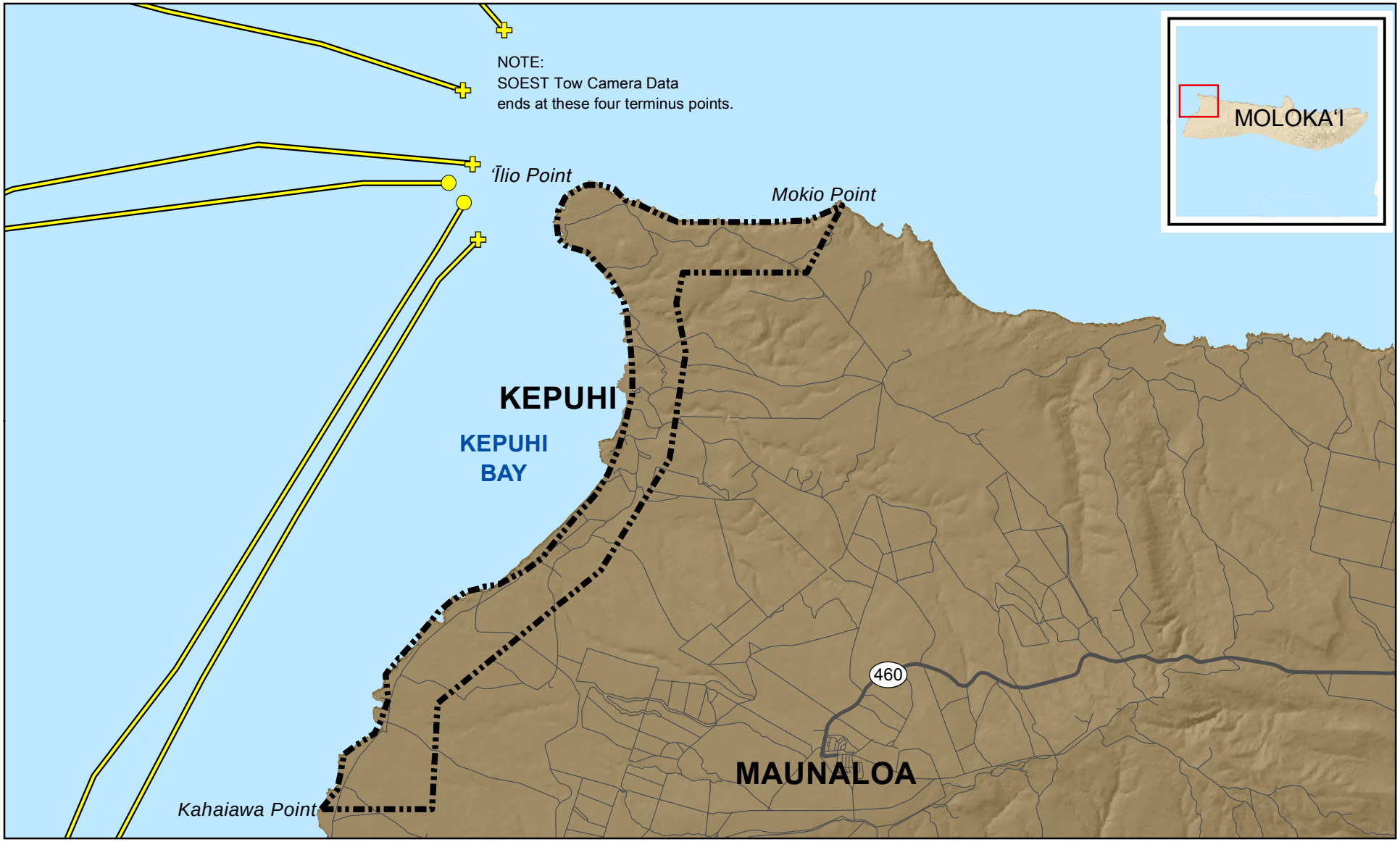
N

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, USCB, UH-SOEST, AECOM, 2012

Figure 3.13-15



West Moloka'i Landing Site Area: 2010 Census

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

2010 Census County Divisions (CCD)

- West Moloka'i

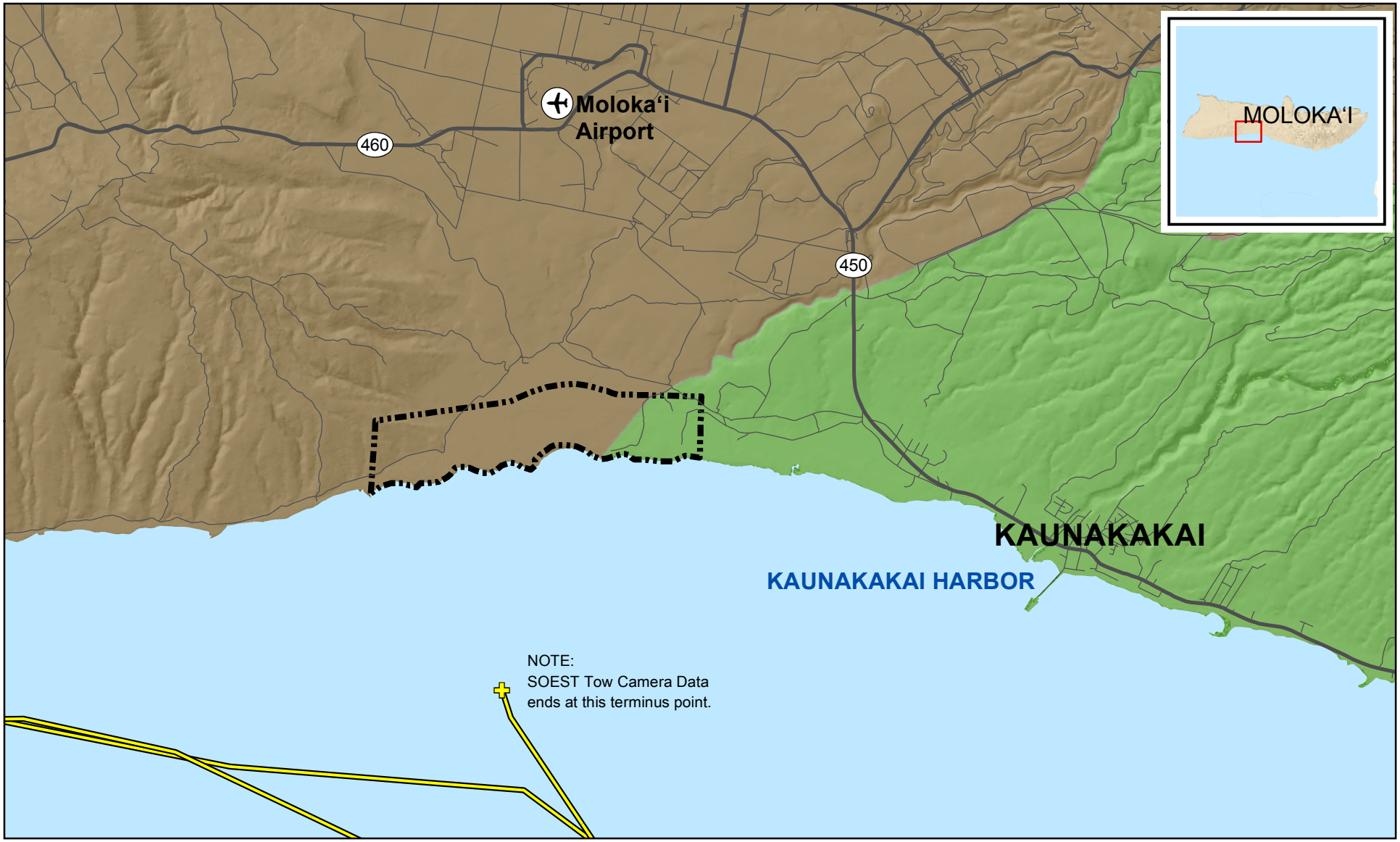
N

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.

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

Figure 3.13-16



South Moloka‘i Landing Site Area: 2010 Census

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

2010 Census County Divisions (CCD)

- East Moloka‘i
- West Moloka‘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.

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

Figure 3.13-17

Kāne'ohe Landing Site Area: 2010 Census

- Route with camera data *
- Route without camera data **
- Identified O'ahu Substation Location
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Federally Owned Lands
- Open Water

2010 Census County Divisions (CCD)

- Ko'olau-Poko

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, USCB, CCH, UH-SOEST, AECOM, 2012

Figure 3.13-18

Pearl Harbor Landing Site Area: 2010 Census

- Route with camera data *
- Route without camera data **
- Identified O'ahu Substation Locations
- Highways & Major Roads
- Other Roads
- SOEST Cable Routes
- HIREP Study Analysis Area
- Federally Owned Land
- Open Water

2010 Census County Divisions (CCD)

- 'Ewa
- Honolulu

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, USCB, CCH, UH-SOEST, AECOM, 2012

Figure 3.13-19