

Chapter 6. Cultural Resources, Social, and Economic Environment

6.1 Refuge Cultural Resources

The Service's Cultural Resources Policy defines cultural resources as archaeological sites, historic places, objects of antiquity, cultural items, or traditional religious values. This section provides a summary of the historical and cultural resources at Keālia Pond NWR, within the surrounding Waikapū ahupua'a, and Molokini. It discusses the Native Hawaiian and Euro-American cultural history of the area, within the context of the broader history of the Island of Maui and the State of Hawai'i.

The early settlement history of the island is a subject of some debate. Some believe that the first Polynesians arrived in Hawai'i around 100 to 300 BCE from the Marquesas and were followed by Tahitian settlers around 1100-1300 CE who conquered the original inhabitants. Others believe that there was only a single, extended period of settlement. Polynesians developed a new Hawaiian culture while maintaining much of the social and political structure of their homeland.

According to Kamakau (1961), traditional Hawaiian land tenure was a system formed in order to care for the land (malama 'aina). Around the 14th century, various individual island mo'i (kings) believed the land should be surveyed and permanently marked in order to institute a boundary system that would settle disputes between neighboring ali'i (chiefs). A kahuna (priest) named Kalaika'ohia is said to have carved Maui into 12 moku (districts), which were controlled by an ali'i 'ai moku. These lands were further divided into ahupua'a, a wedge-shaped land unit that traditionally subdivided resources from the uplands to the shore thereby allowing access to marine and mountain resources. Ahupua'a varied in size and were generally delineated by topographical or natural boundaries such as mountain ridges and streams. Keālia Pond lies in the Waikapū ahupua'a, one of the four ahupua'a that make up the entire southern portion of the larger moku of Wailukū. Molokini islet is in its own moku of Molokini (Chinen 1961, Handy and Handy 1972, Orr 2006).

The idea of holding land was not synonymous with owning it, but more like a trusteeship between the caretakers and the nature gods Lono and Kane (Handy & Handy 1972:41). The ahupua'a is the most well known of all traditional land divisions and is still relevant today. Traditionally, the areas were governed by a konohiki (designated caretaker) and those residing within the region had designated access to all mountain and marine resources. Chinen (1961:5) explains that all chiefs and commoners were entitled to a portion of the mountain and marine resources.

Wailuku District is frequently mentioned in historical texts and oral tradition as being politically, ceremonially, and geographically important during traditional times (Cordy 1981, 1996; Kirch 1985). Wailuku was considered a "chiefly center" (Sterling 1998:90) with many of the chiefs and much of the area's population residing near or within portions of 'Īao Valley and lower Wailuku. The importance of the district is reflected by the relatively large number of heiau (temple sites) that were reportedly present in pre-contact times. Oral tradition accounts surrounding these heiau provide examples of how religion tied into political power in the traditional Wailuku setting. Indeed, the period immediately preceding contact with the Europeans was one of considerable upheaval and conflict.

Political power emanating from Moloka‘i was an active element during the mid-18th century. The resulting battle at Kalae‘ili‘ili in 1765 CE led to the expulsion of Ke‘eaumoku and the Moloka‘i ali‘i and the beginning of Kahekili’s reign (Kamakau 1992). Kahekili successfully defended his capital in Wailukū throughout the 1770s, until his defeat at the hands of Kamehameha I’s forces.

Closer to the current Refuge area, in the southwest corner of Wailukū District, pre-contact settlement was not as dense as concentrations to the north. Climate had much to do with that trend, as the Mā‘alaea area is a more arid environment than the rain-soaked fields to the north. According to Tomonari-Tuggle and Tuggle (1991), the majority of the pre-contact population was located west of the Refuge, near what is now Ukumehame Beach State Park.

6.1.1 Mythological and Traditional Accounts

The Wailukū moku covers the entire isthmus between East and West Maui. This area was also referred to as Na Wai ‘Eha, meaning “the four waters,” and is named after the four major streams (Waikapū, Wailukū, Waiehu, and Waihe‘e) flowing in the windward portion of West Maui. Wailukū and its coastal environs are thought to have been initially settled around 1100-1200 CE. Keālia Pond lies in the traditional district of Waikapū, which has now been absorbed by the Wailukū District. Place names may help determine pre-contact Hawaiians’ perspectives toward individual areas. Waikapū translates literally to “water of the conch” (Pukui 1974:222). W.K. Kaulililehua, in *Ka Nupepe Kuokoa*, cited in Sterling (1998:93), describes the origin of the name:

This place, Waikapū, has a cave away up the stream, about a mile or more from the village. On the left side of the stream is a cave and in the cave was the conch. It sounded all the time, unseen by the public, but a prophet of Kaula‘i listened for it and came to seek with the idea of finding it.

On the northeast side of that stream on the opposite side of the conch that sounded, on the cliff, was a dog named Puapualenalena. Because he heard it, he sought diligently to find it but he did not succeed. Those who guarded the conch were very watchful. The dog kept studying ways of obtaining it.

The owners of the conch did not believe, perhaps, that any supernatural being would succeed in taking it away, so they began to be a little careless. It was not taken, but on the day that Puapualenalena did get it away, they had been utterly careless. After he took it, it sounded no more to this day. It used to be heard everywhere in these islands and was annoying to some people. From this conch, the whole of the place was named Waikapū (water of the conch).

A second hypothesis on the origin of the name was described by G.W. Bates in *Sandwich Island Notes*, cited in Sterling (1998:93):

The first village of any note on the way to Wai-lu-kū is Wai-ka-pū. It contains a population of about five hundred. Here the forces of Kamehameha the Great once assembled for battle at the sounding of the conch-shell. Hence its name, Wai-ka-pū.



Sunset over Molokini L. Beaugard/USFWS

Molokini

Many Hawaiian mythologies involve shape-shifting spirits, beings who could change at-will from animal to human form. According to legend, the beautiful mo‘o (shape-shifting water lizard) Pu‘uoinaina married Lohiau, a chief who lived at Mā‘alaea. Unfortunately for her, the volcano goddess Pele was also in love with Lohiau. In a jealous rage, Pele cut Pu‘uoinaina in two and turned her into stone. Her head became the 360-foot tall cinder cone called Pu‘u Ōla‘i, or Red Hill, which rises above Mākena Beach at the south end of Wailea. Her tail became Molokini Islet (Kalakaua 1989).

Hawaiians visited Molokini to fish and probably also to harvest seabirds, eggs, and feathers. A variety of stone sinkers and lures, used in traditional fishing techniques, are still present in waters around the islet (Starr et al. 2006).

Keālia Pond

The word “keālia” means “encrusted with salt” and it is said that its “most excellent salt” was made using the salt pans in the immediate vicinity of the pond. There are ditches and sluice gates that were built at least 400 years ago to let fish stock such as ‘awa, ‘ama‘ama, and other nearshore fish into the pond. Ashdown noted alternate names for the area (1971:22-24):

“Keālia was the huge fishpond attributed to King Uni-a-Liloa after the death of Pi‘ilani in Lahaina. It was called the pond of Ka-lepo-lepo because, in one story, Uni made his people carry him atop the huge akua stone which was to be placed at one part of the pond. The load was so heavy that the workmen dropped it and the king fell into the lepolepo (dirty water). Others have insisted that the great chief never did suffer such an indignity, like a commoner, but that the name should be Kalepa, meaning the fluttering of the flags of canoes there when the area was a port of call since ancient times.”

6.1.2 Pre-contact History

In pre-contact times, all land from the base of the Waikapū ahupua‘a to below the valley was used for extensive wet-taro planting. Handy and Handy (1972) note that the Waikapū Stream, which flows down the center of the island isthmus from the West Maui Mountains into Mā‘alaea Bay, was “diverted into lo‘i and its overflow was dissipated on the dry plains.” However, most evidence of the traditional terraced taro culture has since been eliminated by extensive sugarcane cultivation. Near the southern portion of the ahupua‘a, on the flat coastal plains of Kīhei and Mā‘alaea, Handy (1940) states that traditional fishing settlements and isolated fisherman houses could be found. In addition, sweet potatoes were cultivated in the sandy soil near the shore in these areas.

Wailukū, meaning “water of destruction,” succinctly describes the area in the late 1700s. Political power emanating from Moloka‘i was an active element during the mid-18th century. In 1776, the chief of the Island of Hawai‘i, Kalaniopu‘u, gathered 800 warriors just east of Keālia Pond at Kīheipukoa. He then led them across the Waikapū commons to attack Kahekili, the chief of Maui,

whose warriors were hiding at the sand dunes of Waikapū. It is estimated that 1,600 people were killed in the Battle of Kakanilua. Only 2 of the Maui warriors survived. Another battle took place in the area shortly after when Kamehameha the Great landed southeast of Keālia Pond at Kalepolepo and invaded the island (Fornander 1969, Athens et al. 1996, Sterling 1998, Desha 2000).

6.1.3 Euro-American Cultural History

In 1778, British explorer Captain James Cook on the *H.M.S. Resolution* is credited with being the first European to visit Hawai‘i. There is some evidence that Spaniards, who first crossed the Pacific Ocean in 1522, also made landfall in Hawai‘i but they never correctly mapped or claimed credit for their accomplishment. Cook recorded sighting Maui in November 1778, anchoring near Kahului but not coming ashore. In 1786, French Admiral Jean-François Lapérouse of the ill-fated *Boussole* was the first European explorer to come ashore on Maui in an area south of Mākena now known as La Perouse Bay. The *Boussole* and its crew vanished in 1788 and the shipwreck was later found in the South Pacific in the current Republic of Vanuatu (Bateson 1972, Speakman 1978).

Keālia Pond lived up to its name as a source for much needed salt for early sailors to the Island of Maui. P. Corney, in *Voyages in the Northern Pacific*, cited in Sterling (1998:95) recounts:

Feb. 1, 1817... We now made sail towards Mowee, our ship, as usual, full of natives. Next morning we passed Morokenee (Molokini), and made sail up Mackerey (Mā‘alaea) bay; here we lay until the 6th, and took on board a great quantity of hogs, salt, and vegetables... On this neck of land are their principal salt-pans, where they make most excellent salt.

Contact with Europeans began a series of plagues for which the Native Hawaiians had no immunities. Their population fell from 300-500,000 in 1778 to only 30,000 by 1900. As trade and shipping brought Hawai‘i into contact with a wider world, it also enabled the acquisition of Western goods, including arms and ammunition. In 1795, Kamehameha the Great of Hawai‘i assembled the largest army the Hawaiian Islands had ever seen, with over 10,000 men and 1,200 war canoes, equipping them with European muskets and cannon. He established the Kingdom of Hawai‘i with the subjugation of the smaller independent chiefdoms of O‘ahu, Maui, Moloka‘i, Lāna‘i, Kaua‘i, and Ni‘ihau over the period 1795-1810.

Lahaina, Maui, became the new capital of the Kingdom of Hawai‘i and it was the center of government for nearly five decades. ‘Iliahi (sandalwood) was the first major item of external trade. By 1805, ‘iliahi had begun to reach China, and by 1809 it was a regular commodity. In 1810, American merchants reached an agreement with Kamehameha for a monopoly on the ‘iliahi trade in exchange for a quarter of the profits. These merchants took a convoy of ‘iliahi ships to China in 1812, making a good profit on their sales. This agreement stood for only one shipment, though, and shortly thereafter the War of 1812 resulted in a British blockade of Hawai‘i for 2 years (Daws 1989).

When trade resumed in 1814, King Kamehameha claimed the trees as his own in a near-monopoly and organized the cutting and transport of ‘iliahi under his public works program. The ‘iliahi trade encouraged the transition to a cash economy, the purchase of luxury goods, and became the main source of revenue for the Hawaiian chiefs. Kamehameha had established commercial trade and foreign business ventures as the best means of obtaining the luxury items and other goods.

Kamehameha's death in 1819 triggered a dramatic change in the social, political, and religious systems of the country. Members of the ali‘i had acquired many of the outward manners and dress of

European civilization during the final years of Kamehameha's reign. His successor Liholiho (Kamehameha II) ended the kapu system and ordered the destruction of images and heiau throughout the Kingdom. Fires were set in the forests to detect 'iliahi trees by their sweet scent. While mature trees could withstand the fire, the flames wiped out new seedlings. By 1830, the 'iliahi trade had completely collapsed (Gast and Conrad 1973, Judd 1966).

The introduction of horses and cattle around the turn of the 19th century aided in transition from the 'iliahi trade to ranching. Cattle hides, tallow, and meat became important commodities of local and international trade. Hawai'i was a major supplier of beef to California during the Gold Rush and subsequently to the visiting whaling ships. At the height of the whaling era (1840-1865) as many as 500 ships anchored in Lahaina's port (Cowan-Smith and Stone 1988).

6.1.4 The Mahele, 1848-1851

Among other things, foreigners demanded private ownership of land to insure their investments. Influenced by these foreign investors, King Kamehameha III instigated the Great Mahele of 1848 and drastically altered the Hawaiian land system by redistributing land ownership between the kings, ali'i, foreigners, and maka'ainana (common people who were fishermen, craftsmen, and farmers). Once lands were made available and private ownership was instituted the maka'ainana were able to claim the plots on which they had been cultivating and living, if they had been made aware of the foreign procedures for Land Commission Awards (LCA). These claims could not include any previously cultivated or presently fallow land, stream fisheries or many other resources necessary for traditional survival (Kelly 1983; Kame'elehiwa 1992; Kirch and Sahlins 1992).

If occupation could be established through the testimony of two witnesses, the petitioners were awarded the claimed LCA and could then take possession of the property. The land that maka'ainana received was less than one percent of total lands. A total of 88,000 people submitted 14,195 requests for land and of these only 8,421 were awarded. In 1850, it became legal for foreigners to purchase land and they received large portions for reduced prices. At this time, many Native Hawaiians lost access to their lands due to mortgage default. Land Commission Awards from that time offer written records and insight into the historic land use of the area. In the Waikapū ahupua'a, claims were concentrated on the southeastern edge of Keālia Pond. Nine of the claims surrounding the pond refer to salt lands (for salt collection), while four claims document house lots (Chinen 1961, Athens et al. 1996, Orr 2006).

6.1.5 Post-1850s History

Another influence that brought change to Maui was foreign commercialism. Two Chinese brothers, Ahung and Atai, of Honolulu's Hungtai Company set up one of its earliest sugar mills. Atai soon created a plant that processed sugarcane cultivated by Hawaiians, named the Hungtai Sugar Works (Dorrance and Morgan 2000:15-16). In 1862, The Wailukū Sugar Company was established and would expand sugar production over the next 126 years. By the turn of the century, a large portion of Waikapū was under sugarcane cultivation. Wailukū Sugar Company ended production in 1988, having averaged over 30,000 tons of sugar produced annually at its pinnacle in the 1970s (Dorrance and Morgan 2000).

The Kingdom of Hawai'i lasted throughout most of the 19th century, when expansion of the sugar industry meant increasing U.S. business and political involvement. Through the *Reciprocity Treaty*

between the United States of America and the Hawaiian Kingdom of 1875, the United States obtained exclusive rights to Pearl Harbor in exchange for allowing Hawaiian sugar to enter the United States duty-free. In 1893, Queen Lili‘uokalani was deposed in a coup d’état led by American citizens supported by the landing of U.S. Marines. The sovereignty of the Kingdom of Hawai‘i was lost to a Provisional Government led by the conspirators, later briefly becoming the Republic of Hawai‘i, before eventual annexation to the U.S. in 1898.

Kīhei was transformed by the advent of WWII. The U.S. military development began on Maui in June 1940 at the NAS Pu‘unēnē located north of the present Refuge. The area surrounding Keālia Pond and Mā‘alaea Bay was used as a training site for the 4th Marine Division in preparation for the Pacific war theater. Over 5,000 marines were housed there. Immediately west of the Refuge boundary there is evidence of a firing range and airstrip. While preparing for the Marianas campaign in 1943 and 1944, military personnel practiced amphibious landings on the beachfront and mudflat areas near the Refuge. Artifacts of these landings, such as concrete and steel barriers, or rock jacks, are still found within the area. Molokini was used for target practice (Athens et al. 1996, Tome and Dega 2004).

Following WWII, the Kīhei coastline returned to the peaceful activities of ranching and development of residential areas. During the 1960s, development of the area as a vacation haven for tourists and homebuyers began, a trend which continues to the present day.

6.1.6 Refuge Archaeological/Cultural Surveys

Athens et al (1996) identifies a “place of note” located northwest of Keālia Pond in Pōhākea. Pu‘u Hele is a sacred area where a cinder cone once stood near the junction of the Lahaina, Wailukū, and Kīhei roads. Ancient prophecy avowed that Pu‘u Hele was a former mo‘o who would “cover all Maui when the foreign tide envelopes our land and people.” The cultural significance of the hill has changed since the cinders were used for road building at the NAS Pu‘unēnē and the hill was eliminated.

In 1979, the Service conducted a 3-day reconnaissance survey of Keālia Pond, which recorded no evidence of historical or archaeological resources at the pond or in the immediate vicinity. Athens et al (1996) lead five trench surveys near the coastal dunes and a paleoenvironmental core analysis in the mudflat area for the proposed boardwalk, kiosk, and parking project. No historical or cultural remains (pre-contact Hawaiian or WWII) were found during the survey. Athens et al. (1996) concluded that it is not likely that cultural resources are present within the Refuge boundary due to the site’s close proximity to an active beach and the nearness of the upper soil deposits to the water table.

The most recent archaeological and cultural investigation occurred in 2009 and was specific to 13 acres in the forested habitat along the entrance road prior to construction of the new HQ/VC. There is no pre-contact evidence within this area; however, the investigation confirmed the area was used for cattle ranching from the rock area with cattle troughs. The researchers did not find any new evidence of Hawaiian occupation within or adjacent to the Refuge.

6.1.7 Archaeological Resources

The Archaeological Resource Protection Act of 1979 defines archaeological resources as the following: “Any material remains of past human life or activities which are of archaeological interest” and “at least 100 years of age” (16 U.S.C. 470bb(1)). According to 36 CFR Part 296.3, remains are considered of archaeological interest if the resources are “capable of providing scientific or humanistic understandings of past human behavior, cultural adaptation, and related topics through the application of scientific or scholarly techniques such as controlled observation, contextual measurement, controlled collection, analysis, interpretation and explanation.”

Several archaeological surveys and literature reviews have been conducted for Keālia Pond NWR and additional projects in the vicinity. These studies show that Keālia Pond was an important site for gathering salt and may have been used as a fishpond. Apart from the pond itself, no archaeological items or sites have been encountered in the area. Any areas that may have been suitable for habitation and/or cultural activities were most likely eliminated or modified by amphibious landings during WWII (Athens et al. 1996).

6.1.8 Paleontological Resources

Unless found in an archaeological context, “nonfossilized and fossilized paleontological specimens, or any portion or piece thereof,” are not considered archaeological resources (16 U.S.C. 470bb(1)). However, paleontological resources are protected under the Paleontological Resources Preservation Act of 2009. Paleontology resources include life forms that existed in prehistoric or geologic times, as represented by the fossils of plants, animals, and other organisms. Ziegler (2002) defines fossils as “biological remains, whether permineralized or not,” that were “deposited in the islands before the time of European contact (CE 1778) and are not definitely components of prehistoric archaeological midden (human food refuse and other cultural debris).” Fossils have been uncovered in a variety of sites throughout Hawai‘i, including sand dunes, sinkholes, lava tubes, and pond deposits.

Olson and James (1982) state that no substantial avifaunal fossil deposits have been found on Maui. Although the isthmus between East and West Maui may have been a potential fossil site due to its calcareous sand composition, the area is largely developed or vegetated. A paleoenvironmental core sample was conducted by Athens et al. (1996) to a depth of 17.16 feet within the mudflat area of Keālia Pond. In addition to providing information on traditional Hawaiian activities in the area, the core was intended to gather data on the prehistoric environment and vegetation. No animal fossils or fossils of other organisms were encountered on site during this survey. Radiocarbon dating of the paleoenvironmental core documented a 5600-year-old sequence. Consistent with investigations on other Hawaiian Islands, the chronology of the core suggested that the sand berm along Keālia Pond developed when sea level was regressing around 3,700-4,000 years ago (Athens et al. 1996).

Well-preserved pollen and spore samples provide insight into the lowland vegetation of Maui prior to human settlement. Overall, the area most likely fluctuated between a parkland/shrubland and a dry forest. Similar to studies conducted on O‘ahu, the pollen record in the core showed that the pre-human vegetation at Keālia Pond during the Holocene epoch was influenced by a series of climatic shifts. The earliest pollen assemblage (5,600 years ago) was characterized by lowland forests, indicating that the climate was warmer and wetter. About 2,000-4,500 years ago, the climate became drier. This change is associated with significant volcanic activity, as supported by a period of high charcoal particles in the core. Finally, the pollen record from 1,800-2,000 years ago indicates that

conditions became wetter again. Periods of concentrated charcoal particles in the core reveal that natural fires were common in the lowlands of Maui throughout the Holocene (Athens et al. 1996).

6.2 Social and Economic Setting

The purpose of this section is to address the local economy and social environment surrounding the Refuge, including population estimates and economic indicators. Keālia Pond lies between the towns of Mā‘alaea and Kīhei within the County of Maui, which encompasses the Hawaiian Islands of Kaho‘olawe, Lana‘i, Maui, and Moloka‘i. There is no habitation on Molokini.

6.2.1 Population

The 2010 Census data shows Maui County experienced significant population growth in the past decade with a 21 percent increase to 154,834 residents. Of these, 144,444 are living on the Island of Maui. The State Department of Business, Economic Development, and Tourism’s (DBEDT) released data on Maui’s racial make-up from the 2010 Census. The white race group had the largest number of people with a count of 74,329 and they comprised 52 percent of the population; meaning that about 1 in every 2 persons was at least partially white in Maui County. The Asian group was the next largest with 66,925 people or 46 percent of the population. The Native Hawaiian and Other Pacific Islander race group consisted of 36,971 people and made up 26 percent of Maui’s population. This meant that about 1 in every 4 of Maui’s residents claimed to be at least partially Native Hawaiian and/or Other Pacific Islander with regard to race (Census 2010).

Data numbers specifically refer to the “race alone or in combination”, and include all people that belong to a certain race group, whether the person reported that they were only of that single race or whether they reported that they were that race in combination with one or more of the other major race groups. Therefore, individuals may be counted in more than one race category.

For the first time, the combined communities of Kīhei and Wailea have taken the lead as Maui's largest town with a population of 26,918 in 2010. There has been a tremendous influx of new residents compared to 1970 when the Census Bureau did not even acknowledge the existence of a community in South Maui. A much smaller community, Mā‘alaea saw a 22.5 percent population decrease since the 2000 census for a current count of 352 (DBEDT 2011).

Table 6.1. Population figures for selected areas.

Area	Population (1990)	Population (2000)	Population (2010)	Density per Sq Mi (2010)
Kīhei	11,107	16,749	20,881	2,055.3
Mā‘alaea	443	454	352	73.8
Maui Island	92,566	118,371	144,444	198.7
Maui County	100,374	128,094	154,834	133.6
Hawai‘i State	1,108,229	1,211,537	1,360,301	211.8

Source: U.S. Census Bureau 2010

6.2.2 Housing

Since 2000, Maui County's strong local economy, low mortgage interest rates, and mainland investment in real estate, have spurred a huge demand in housing. Off-island buyers are contributing to the increased housing demand with nearly a fifth of the housing units in the County not inhabited by County residents. Within the County, the median household income in 2005 was \$57,573, and the median housing value was \$573,400. The Census Bureau estimated that Maui residents paid an average of \$24,204 per year in mortgage costs, 42 percent of their income. The generally accepted definition of affordability is for a household to pay no more than 30 percent of its annual income on housing. Families who pay more than 30 percent of their income for housing are considered cost burdened and may have difficulty affording necessities such as food, clothing, transportation and medical care. The majority of Maui County residents are paying an unsustainably high percentage of their income toward housing (Maui County Planning Department (MCPD) 2006, MCPD 2010).

Homelessness and the difficulties associated with finding affordable, legal, and safe housing are growing problems throughout Hawai'i. According to the Homeless Service Utilization Report (2009), there were 1,115 people in homeless shelters in Maui County in 2009. Several service organizations throughout the County assist in providing emergency and transient housing.

6.2.3 Education

In 2005, the Census Bureau estimated that 86.6 percent of County residents age 25 or older have graduated high school and 23.8 percent have a bachelor's degree or higher. While the high school graduation rate of Maui County is slightly higher than that of the remainder of the United States, the percentage of residents with higher-level degrees is lower. Until 2009, Maui Community College was one of seven community colleges in the UH System. In the spring of 2010, the Western Association of Schools and Colleges approved the name change from "Maui Community College" to "University of Hawai'i Maui College" to provide a more accurate reflection of the college's three baccalaureate degrees. The main 78-acre Maui campus is in Kahului, Maui with additional education centers located in Hāna, Maui and on the islands of Moloka'i and Lana'i. The student population numbered around 4,400 students in the spring semester of 2011.

The City of Kīhei has three public elementary schools, one private elementary school, one public intermediate school, and one public high school. The Kīhei-Makena Community Plan (1998) identifies the elementary school environment as one of the most important problems facing the community, describing classrooms as "crowded, uncomfortable, and generally poor" (MCPD 1998, MCPD 2006).

6.2.4 Economics

The median household income for the Island of Maui in 2009 was \$64,150. In 2007, the Census Bureau reported that Maui County was home to 2,111 businesses owned by "Native Hawaiians and Other Pacific Islanders." Unemployment figures for the island in January 2011 were at 7.9 percent, almost double the 4 percent unemployment rate in 2005. The most recent income figures for communities near the Refuge are shown in Table 6.2 (MCPD 2006, DBEDT 2010, Census 2010).

Table 6.2. Census Bureau estimated median and per capita income, 2009.

Area	Median Household Income	Median Family Income	Per Capita Income
Kīhei	\$63,223	\$75,926	\$29,519
Māʻalaea	\$64,875	\$120,268	\$51,259
Maui County	\$64,150	\$72,367	\$29,121

Source: U.S. Census Bureau 2010

The economy on Maui is largely based on tourism. As the second most popular Hawaiian Island behind Oʻahu, there were 1,932,357 visitors to the Island of Maui in 2009 with an average daily count of 41,608 people. The hotels and service industry employs the largest amount of Maui residents, with 17,836 jobs in 2009 bringing in \$565,032,534 in wages. Major employers include: Town Reality of Hawaiʻi, Grand Wailea Resort Hotel, and Hyatt Regency Maui Resort & Spa (DBEDT 2010).

The main tourist attractions for Maui island visitors include: Maui Ocean Center, historic whaling town of Lahaina, the road to Hāna, Kaʻanapali beaches, Haleakalā National Park, and Kīpahulu. The areas surrounding Māʻalaea Bay and coastal Kīhei, which have seen extensive development of resort hotels, condominiums, and other commercial structures, are particularly important sites for tourism. Recreational visits to Keālia Pond NWR also directly contribute to the local economy. Visitor expenditures include food, lodging, transportation, and other expenses while engaging in activities on the Refuge. Approximately 2,700 people have visited the Refuge each year for bird watching, photography, EE, and various habitat restoration projects. Visitation is expected to increase with the new VC and EE programs (Speakman 1978, CH2M Hill, Inc. 1997).

Agriculture remains an important component of Maui’s economy. Top products in Central Maui (near Keālia Pond) include: bananas, cattle, flowers, hogs, nursery products, pineapples, sugarcane, taro, and vegetables. The HC&S dominates the agriculture industry on the Island. They are looking to diversify with a study on producing advanced biofuels from sugarcane grown on Maui. The Office of Naval Research is budgeting \$2 million annually for the project through 2015, with a focus on producing diesel and jet fuel from sugar (MCPD 2010, UH 2010).

The State of Hawaiʻi is investing in the advanced commercial high technology sector on Maui. Specific areas of interest include information technology, telecommunications, biotechnology, and space science. Kīhei, which contains two high-technology centers, has become a prime location promoting the development of this sector. Both the Maui High Performance Computing Center and the Maui Research and Technology Center are important elements in promoting the State as a center for innovative technology and ensuring a competitive economy in the future. Maui is also an important center for advanced astronomical research. The Haleakalā Observatory was Hawaii's first astronomical research and development facility at the Maui Space Surveillance Site electro-optical facility where satellite tracking facilities are co-located with a research and development facility (MCPD 2010).