

# Wao Kele O Puna



## Wao Kele O Puna, Hawai'i

By Holly K. Coleman

Wao Kele O Puna is the name of a Forest Reserve in the district of Puna on the island of Hawai'i. Covering 25,856 acres, Wao Kele O Puna is the largest native lowland rain-forest remaining in Hawai'i, and is home to more than 200 native plant and animal species, many of which are threatened or endangered. Wao Kele O Puna stretches over 20% of the Pāhoa Aquifer, which is the largest source of drinking water on the island (MacKenzie et. al, 2007).

Historically, Wao Kele O Puna was an important place for resources and was spiritually significant for residents of Puna. Plans to develop geothermal energy in Wao Kele O Puna beginning in the late 1980s resulted in important community activism and legal challenges that sought to preserve Wao Kele O Puna and Native Hawaiian rights. Wao Kele O Puna was purchased for preservation in 2006 following the coordinated efforts of the Pele Defense Fund, the Trust for Public Lands (TPL), as well as federal and state government agencies, including the Office of Hawaiian Affairs (OHA). Today, Wao Kele O Puna makes up over 90% of OHA's landholdings.

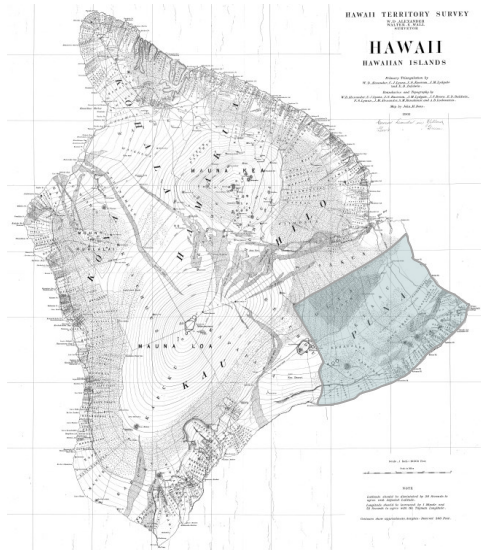
Wao Kele O Puna remains a vital cultural and historical resource for Native Hawaiians and the broader community. The goal of this Information Sheet is to explore some of the cultural and historical narratives of Wao Kele O Puna and the surrounding areas, particularly as OHA transitions into the role of caretaker of this place. This Information Sheet will also strengthen the agency's foundation of knowledge for this *wahi pana* (storied, legendary place).

Left: 'Ōhi'a in Wao Kele O Puna, Hawai'i. Source: OHA, 2011.



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## Land Regions: Traditional Names of Hawaiian Forest Environment



The shaded area depicts the *moku* of Puna, Hawai'i.  
Source: Donn, 1901.

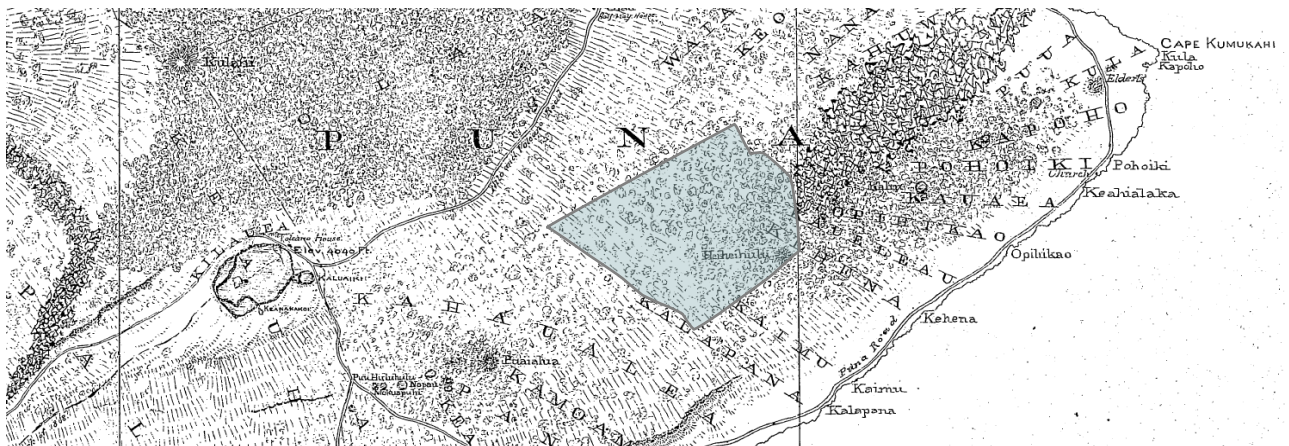
## Location and Name Meaning

Puna is one of six *moku* (districts) on the island of Hawai'i, and shares boundaries with Hilo to the northeast and Ka'ū to the southwest.

The forest that makes up Wao Kele O Puna originally stretched across several contiguous *ahupua'a* (land sections) of Puna, though today the Forest Reserve is situated in the *ahupua'a* of Waiakahuila and Ka'ohe. Native Hawaiian scholar Mary Kawena Pukui (1986) gives the definitions of "rain belt" and "upland forest" for the term *wao kele*. People commonly referred to this area as "*wao kele o Puna*," (rainforest or wet area of Puna) because it is a traditional descriptive term for particular environmental regions, rather than a specific or formal name for the Puna forest. Today, the historical term for this region, *wao kele o Puna*, has come to refer to the specific *'āina* which is now stewarded by OHA as Wao Kele O Puna.

Native Hawaiians identified different *makai* (seaward) and *mauka* (upland) areas in horizontal environmental zones, carefully distinguishing between waters and lands that supported different flora and fauna. These bio-geographical demarcations were also influenced by Hawaiian spirituality (i.e. the *wao akua* was considered a forest zone inhabited by the gods) as well as the scope of possible human interaction or activity with the environment in a given area (i.e. the *pahe'e* was an area for wetland agriculture) (Maly, 2001).

Wao Kele O Puna lies within two traditional forest zones: the *wao akua* and the *wao ma'ukele*. The *wao akua* was not often entered by Native Hawaiians unless there was need for a specific type of tree or resource found nowhere else, as it was considered a spiritual realm. The *wao ma'ukele* was a forest zone just above the *wao akua* that was known as a rain-forest area where very large and very old trees such as *koa* (*Acacia koa*) and *'ōhi'a lehua* (*Metrosideros macropus*) grew.



The shaded area depicts the approximate boundaries of the Wao Kele O Puna Forest Reserve. Source: Wall, 1886.



## Historical and Legendary Background: Selected Mo'olelo of Puna



A black sand beach, probably Kalapana, Puna on Hawai'i Island, ca. 1940. Source: UH Mānoa, Rare Photograph Collection.

*Mo'olelo* (historical legends) reveal the nature of life in Puna. Puna is an especially sacred district because of its easternmost position in the Hawaiian islands as well as its association with the sun and the *akua* (god) Kāne. The morning sun first touches the islands at Kūmukahi (beginning, origin); nearby Ha'eha'e is known as the eastern gate of the sun. As a result, these place names often appear symbolically in *mele* (compositions) (De Silva, 2013).

The forests of Puna are important in the *mo'olelo* of Puna. The upper forests of 'Ōla'a and Kea'au were said to be the location of the mythical oasis Paliuli, home of the famed beauty Lā'iekawai; she lived in a house made of sacred golden feathers. In another *mo'olelo*, a *kahuna* (priest) named Waiākea seeks the youth Pīkoika'alalā after the canoemakers of the *ali'i nui* (high chief) Keawenuia'umi were unable to work in the forests of 'Ōla'a because of two meddlesome bird *akua* (gods). Engaging in an archery contest with the famous archer Ma'inele, Pīkoi was able to shoot the birds, allowing canoes to be made in the uplands again (Kauī, 1865).

Puna's history is bound with Ka'ū and Hilo. This affiliation was especially strong with Ka'ū; people in Ka'ū were known as *mākaha* (fierce) while people in Puna were known as *kūmākaha* (standing fierce). The *'ōlelo no'eau* (wise saying) "*Hilina'i Puna, Kālele ia Ka'ū*" (Puna leans and reclines on Ka'ū) evokes this relationship (Pukui, 1974). Access to the rich resources of Puna by the *ali'i* (chiefs) often depended on political control of these neighboring districts; in his conquest of the island, 'Umiāniloa sent countless challengers to claim control of the district from the renowned blind chief 'Īmaikalani of Puna and Ka'ū (Kamakau, 1992).

### Epic Migrations

Puna plays a prominent role in traditional Hawaiian migration stories. The famed *kahuna* (priest) Pa'ao lands in Puna first and builds Waha'ula, a *luakini heiau* (sacrificial temple) for one of his *akua* (Kamakau, 1992). The chief Mo'ikeha landed in Puna; his brothers, Kūmukahi and Ha'eha'e, remained in Puna, lending their names to the land (Beckwith, 1970). In the *mo'olelo* of the migrant chief Hawai'iloa, Puna was named by the companion Ku-nui-ai-a-ke-Akua after his birthplace Punaauia in Tahiti (Fornander, 1919–1920).

## Pelehonuamea and the District of Puna



Before the coming of the goddess Pelehonuamea, Puna was a lush and fertile land. Indeed, Puna was known as “*He ‘āina i ka houpo o Kāne*,” a favored land in the bosom of the *akua* Kāne.

Traveling from Kahiki with her family and retinue, Pele engaged in a battle with the *mo’o* (water spirits) Waka-keakaikawai and Puna’aikoa’e, beginning in Punalu’u, Ka’ū and ending in Waiakea, Hilo. Wakakeakaikawai fled through Puna and so it was covered in lava by Pele during the chase (McGregor, 2007).

In another *mo’olelo*, the demigod Kamapua’a desired Pele. Denying his advances, they battled; Pele sent flames and lava while Kamapua’a called upon the gods to send fog and mists. All of Pele’s fires were extinguished, save for the fire-making stick, and Pele yielded. Dividing the districts between them following the battle, Kamapua’a takes Kohala, Hāmākua, and Hilo. Pele takes the districts of Puna, Ka’ū, and Kona (Beckwith, 1970). The child born from their union, Opelunui-kauhaalilo, was an ancestor of chiefs and the common people (Kamakau, 1991).

Thus Puna became well-known throughout the Islands as the district of Pele, and she was believed to make her home at Halema’uma’u in Kīlauea. Indeed, Pele’s presence in Puna was greatly felt by residents and recorded in their *mo’olelo* of her powers and deeds. Puna became the seat of worship of Pele, and many families of the area are of genealogical descent that tie them to Pele (MacKenzie et. al, 2007).

Wao Kele O Puna is also tied to Pele; the name may be an abbreviated form of Wao Oma’u o Kele o Puna, referring to Oma’u, one of Pele’s aunts and a member of the Pele clan (MacKenzie et. al, 2007).

## Pele and Hi’iaka

Hi’iakaikapoliopole is the beloved youngest sister of Pele, born from an egg brought from Kahiki. Hi’iaka was the first to perform a *ha’a* or *hula* (dance) at Hā’ena in Puna. Known as a *kāula* (prophet, seer), she was responsible for the growth of new life after the devastation of Pele’s lava flows. Sent to fetch Pele’s *kāne i ka pō* (dream lover), Lohi’au, Hi’iaka leaves her friend and *kumu hula* (teacher), Hōpoe (also known as Nānāhuki), in Puna. Thus, she begins an epic journey that takes her throughout the Hawaiian islands. Becoming impatient, Pele destroys the prized *lehua* groves of Hi’iaka and turns Hōpoe to stone. In anger, Hi’iaka takes Lohi’au as her husband (Hooulumahie, 2008).



Top: Lava in Halema’uma’u Crater, Kīlauea ca. 1940. Source: UH Mānoa Hamilton Rare Photograph Collection.  
Middle: Red *lehua* in Wao Kele O Puna, Hawai’i. Source: Office of Hawaiian Affairs, 2011.  
Bottom: Green Lake or Ka Wai o Pele, Kapoho, Puna, Hawai’i, ca. 1890s. Source: Hawai’i State Archives.

## Landscape and Resources

A *wahi pana* of many resources, the landscape of Puna is one that has been shaped by both the growth of lush forests and frequent volcanic activity. Nearshore fisheries were enriched by freshwater drawn by the rainforests and discharged by lava tube systems near the ocean. Lowland and coastline areas were sometimes marshy and supported vast groves of *hala* (pandanus) trees. The uplands were forested with ferns such as the *hāpu‘u* (*Cibotium splendens*) and trees such as the *koa* or ‘*ōlapa* (*Cheirodendron trigynum*), though the landscape was dominated by the hardy ‘*ōhi‘a lehua* (Juvik & Juvik, 1998).

## Life and Activity in Puna

Trails crossed Puna, running overland from Ka‘ū and Hilo, as well as from the coast to the mountains. The trail known as Ala Loa was particularly famous because it traversed the entire island and was used by people of Kona, Ka‘ū, Puna, and Hilo to trade goods (Mills, 2002).

Lands near the coastline, like Kea‘au, Hā‘ena, and Kapoho, supported larger populations than the upland and heavily forested areas, which were sparsely inhabited. However, residents of these lower areas traveled *mauka* to the lowland forests for resources; historical evidence suggests that certain areas of the forest were farmed or maintained by residents who grew important food crops like ‘*uala* (sweet potato) and *mai‘a* (banana) (Maly & Maly, 2004; MacKenzie et. al, 2007). While most other areas of Hawai‘i relied on *kalo* (taro) as a staple food item, the people of Puna relied on *ulu* (breadfruit) (Handy et. al, 1991). People in Puna also developed a unique method of farming; to honor the *kapu* (sacred restrictions) of the *ali‘i*, they would plant ‘*uala* on woven mats that could be moved so that they were always at the right hand of the chiefs who traveled along the trails in Puna (Handy et. al, 1991). ‘*Ōpelu* (mackerel scad) and *aku* (bonito) fishing were also important (McGregor, 2007).

Puna was well-known for treasured *mea waiwai* (raw materials and other items of value) such as bird feathers, canoe trees, and cordage, that were prized throughout the islands. Puna was famous for its ‘*awa* (*Piper methysticum*), which was said to be particularly potent. Extensive *niu* (coconut) and *hala* (pandanus) groves once grew from Kapoho to ‘Opihikao (Handy et. al, 1991), and Puna was renowned for the *ahu moena makali‘i* (mats of a particularly fine weave). Puna was also known for unique *kapa* (bark cloth); the *eleuli* was dark colored and perfumed and the *ouholowai* was made from *māmaki* (*Pipturus albidus*) that was colored differently on its two sides (Kauai, 1865).



Hawaiians pounding poi in Puna, Hawai‘i, ca. 1897–1898. Source: Hawaiian Historical Society.



## Traditional Use of the Forest

The centrality of the forest to the character of life Puna is documented in several *‘ōlelo no‘eau*; the phrase “*ka makani hali ‘ana ke ala o Puna*” describes winds that bore the fragrances of the forests of Puna to other parts of the island (Pukui, 1983). Indeed, the wealth provided by the forest made Puna a highly desirable district in the historical politics of the Hawaii Island *ali‘i*.

Native Hawaiians would rarely enter the upper forests rarely because of their spiritual significance. Entering the forest always required the observance of different levels of ritual and prayer depending on the desired activity to be performed. However, Wao Kele O Puna was also important for subsistence for Puna residents. Parts of the forests were visited by farmers, travelers, bird hunters, *kahuna* (priests), woodcarvers, canoemakers and others. The forest was a crucial source of *lā‘au* (vegetable matter) for foodstuffs, tool and implement creation, construction, and firewood. The forests also produced medicinal plants and herbs used by *kahuna lā‘au lapa‘au* (medicinal healers) (Matsuoka et. al, 1996).

## Lava Tubes and Caves

Systems of lava tubes and caves formed by ancient volcanic activity are present in Puna. Native Hawaiians sometimes lived in these formations, which offered shelter to travelers and bird catchers. Hawaiians also used the caves and lava tubes for burials; a number of these sites have been identified within Wao Kele O Puna (Matsuoka et. al, 1996).



The extinct Hawai'i Island 'Ō'ō. Source: Rothschild, 1907.

## Bird Catchers and Canoe Makers

The forests of Puna were sources of the feathers used in chiefly symbols of power, such as *ahu* (feathered capes) and *kāhili* (feather standards) (Brigham, 1895; Buck, 1957). Feathers from the *mamo* (*Drepanis pacifica*), 'ō'ō (*Moho nobilis*), and 'ō'ū (*Psittirostra psittacea*) of Puna were especially prized. Employed by the *ali'i*, birdcatchers known as *kia manu* used nets, branches covered in sap, or snares for their work, though each *kia manu* had unique methods of catching birds. These individuals lived in the forests for weeks at a time (often accompanied by their families) and were familiar with the favorite foods, perching places, habits, and calls of each bird (Emerson, 1895).

Skilled *kahuna kālai wa'a* (canoe carvers) were also employed by the *ali'i* and made use of the forests of Puna, which were prized for the presence of many trees that were considered suitable for the canoes of a chief. These trees had to be of the proper size, age, and type, and were usually placed under *kapu* so that they could not be felled by anyone but individuals sent into the forests by the *ali'i*. Canoe makers travelled into the forests to identify, cut, shape, and transport trees; they were also experts in omens relating to the soundness of a chosen tree. Processes related to the making of a canoe were accompanied by many rituals observed by the *kahuna kālai wa'a* (Buck, 1957).

## A Changing Puna

Social, economic, and political shifts occurred throughout Hawai'i during the 19th century. In particular, the erosion of traditional Native Hawaiian authority, as well as the integration of Euro-American values and structures, would change Puna.

Rapid depopulation was particularly devastating. Although Puna was never as heavily populated as other districts on Hawai'i Island, its population drastically declined after a series of epidemics, including measles, dysentery, influenza, and smallpox, took hold across Hawai'i in the 1840s (Schmitt & Nordyke, 2001).

The shift from a subsistence to a wage economy would lead to a number of socio-cultural changes. In Puna, economic development was centered around the towns of Pāhoa and 'Ōla'a. Yet large portions of Puna's population would move to areas like Hilo and Kona, or even to the rapidly industrializing Honolulu. The loss of a substantial amount of the resident Native Hawaiian population in Puna led to changes in family structure, cultural practice, and knowledge transmission.

This also led to declines in traditional land tenure, resource management, and subsistence practices. Historical records indicate that the forests of Puna once covered greater expanses of land and descended further towards the coastline. However, beginning in the early 1800s, new types of economic activities would accelerate deforestation. The sandalwood trade, would peak in the early 1820s and resulted in the extraction of sandalwood from the forests of Puna. Sugar cultivation, ranching, and the *pulu* (fern wool) industry would all increase deforestation in Puna.



A fissure in Wao Kele O Puna, Puna, Hawai'i. Source: OHA, 2011.

### The Effects of the Māhele in Puna

Seeking to address rising political pressures beginning in the mid and late 1840s in the Hawaiian Kingdom, a series of laws known collectively as the Māhele created legal mechanisms for land privatization in Hawai'i.

As a district, Puna had the smallest number of private land awards granted under the Māhele. Instead, much of the forested lands in Puna were designated as public lands (Crown and Government Lands). In the decades following, the rights of the *hoa'āina* (tenants) to access and gather resources on private lands was retained; thus many Native Hawaiians continued to use the forests for resources during the monarchy period (McGregor, 2007).

Following the overthrow of the Hawaiian monarchy in 1898, Government and Crown Lands of the Kingdom passed to the Provisional Government, the Republic of Hawai'i, the Territory of Hawai'i, and eventually the State of Hawai'i. Lands now known as Wao Kele O Puna were considered Government Lands. However, conversion of many of these lands to private landholdings eventually allowed individuals with economic interests to acquire large tracts of land in Puna.

## New Economic Activities

Following the Māhele, several industries developed on the lands and in the forests of Puna. Coffee was one of the first crops planted extensively in Puna in the late 1890s. There was also a small lumber industry for *koa* and *‘ōhi’a* that coincided with the rise of sugar in the area (McGregor, 2007). Road improvements and interest in the volcano from the scientific community greatly increased tourism to Kīlauea; lodges known as halfway houses were established in Puna to serve travelers.

### The Pulu Industry

*Pulu* is a yellowish, wool-like fiber that encases the young leaves of the *hāpu‘u* (*Cibotium glaucum*) fern. *Hāpu‘u* were once common in most of the Hawaiian islands, and *pulu* was traditionally used to treat wounds, as stuffing for pillows and mattresses, and in burial practices.

*Pulu* became an industry in the 1850s. Gathering *pulu* was tedious, and many scholars say that this industry had negative impacts on the resident population of Puna. At its height in the 1860s, between 200,000 to 600,000 pounds were exported to San Francisco, Australia, Canada, and Oregon (Thrum, 1927).

Unfortunately, *hāpu‘u* are very slow-growing, and gatherers would often chop down the entire fern. While *hāpu‘u* forests once covered large areas of Hāmākua, Hilo, Puna, and Ka‘ū, the *pulu* industry resulted in a significant decline in their abundance.

### Sugar and Ranching

The rainy and fertile areas of Puna were perfect for sugar cultivation and grazing animals such as cows and sheep. Sugar and ranching became major industries and shaped the district.

Much of the lowland forests of Puna were cleared for cane fields; the ‘Ōla‘a Sugar Company (Puna Sugar Company) was incorporated in 1899 and was one of the largest plantations in Hawai‘i, with lands in Kea‘au, Kapoho, Pāhoa, and other areas of Puna (Baldwin, 1908). Beginning in 1899, tracks for a railroad of the Hilo Railroad Company were built throughout Puna to transport cane. Japanese, Puerto Rican, and Filipino laborers were brought to work on the plantations, though they mostly settled in upland areas like ‘Ōla‘a, while Hawaiian families continued to live along coastal areas in lower Puna, like Kalapana (McGregor, 2007).



Automobiles traveling across lava to Kīlauea, ca. 1924. Source: Tai Sing Loo, Hawaiian Historical Society.



## Preservation Efforts

Under the Republic and the Territory of Hawai'i, much of the forests making up what is today known as Wao Kele O Puna were preserved as government lands and eventually became part of the Puna Forest Reserve. Government Lands were "ceded" to the US in the 1898 Joint Resolution annexing Hawai'i. When Hawai'i became a state, the Admission Act provided that ceded lands were to be held in public trust for five purposes, including the betterment of conditions of Native Hawaiians. In 1970, the Hawai'i Legislature established the Natural Area Reserve system, which was meant to protect pristine areas and unique resources in perpetuity. In 1981, Wao Kele O Puna was designated as a Natural Area Reserve.

Wao Kele O Puna remained important for subsistence practices throughout these historical changes. During the latter half of the 19th century, residents would hunt wild goats and pigs in the forests (McGregor, 2007). The loss of lowland forests in other parts of Hawai'i led people from other *ahupua'a* to travel to Wao Kele O Puna to gather resources; esteemed cultural practitioner Henry "Papa" Auwae noted that the *lā'au* he gathered there were unmatched in terms of quality and potency (Borg, 1999). Other subsistence practices which are dependent on the resources of Wao Kele O Puna continue today.



Aerial view of Wao Kele O Puna. Source: OHA, 2011.

## Geothermal Energy

In the early 1980's, the Campbell Estate proposed the developing geothermal energy on its lands in the *ahupua'a* of Kahauale'a in Puna. However, the 1987 eruption of Kīlauea covered these lands with lava, making them unsuitable for geothermal. In order to support sustainable energy initiatives, the State of Hawai'i initiated a land swap, exchanging the private Campbell Kahauale'a lands for public state lands in Wao Kele O Puna, which were part of the Natural Area Reserve (MacKenzie et al., 2007). Forest was cleared, geothermal wells were drilled, and a power plant was built.

Residents of Puna expressed a number of concerns regarding the geothermal development. Many members of the community felt that their health and safety were threatened by hazardous emissions of toxic gases at the power plant and well sites. Plans for producing energy for Honolulu that would be transmitted through an undersea cable also angered residents. Conservation advocates and scientists decried the destruction of the forest. Additionally, many Native Hawaiians believed that extracting geothermal energy desecrated the *akua* Pele and inhibited traditional cultural practices.



Wao Kele O Puna. Source: OHA, 2011.

## Community Activism

Community activism played an important role in efforts to preserve Wao Kele O Puna, and was coordinated and led by the Pele Defense Fund and other organizations. In March of 1990, over 1,500 protesters marched against geothermal development in one of the largest protests in the history of the state. More than 140 people were arrested.

Additionally, a series of legal challenges were filed by community members. While not all cases were successful, they represented coordinated legal efforts to protect Wao Kele O Puna and Hawaiian rights. In *Pele Defense Fund v. Paty* (1992), the Hawai'i Supreme Court removed legal requirements of residency within an *ahupua'a* when considering the practice of customary and traditional rights. This was an important case for Native Hawaiians who use Wao Kele O Puna for hunting, gathering, and religious and cultural purposes and more closely aligned traditional and cultural rights with ancient practice.

## OHA and Stewardship

The Campbell Estate decided to stop its geothermal efforts in 1994 and announced the intent to sell Wao Kele O Puna in 2001. Seeking a permanent way to protect the forest, the Pele Defense Fund worked with the nonprofit organization Trust for Public Land and the State of Hawai'i Department of Land and Natural Resources (DLNR) for several years to purchase Wao Kele O Puna. TPL was able to raise \$3.4 million in funds from the US Forest Service; OHA contributed an additional \$250,000 and Wao Kele O Puna was purchased in 2006. TPL conveyed the lands to OHA with the stipulation that OHA would not allow geothermal development to occur in Wao Kele O Puna.

The acquisition of Wao Kele O Puna represented the first time ceded lands were returned to an entity specifically designated to manage Native Hawaiian lands in trust. Under a unique memorandum of agreement, Wao Kele O Puna will be jointly managed by OHA and DLNR until 2016. The agreement directs DLNR to teach OHA staff about current land and natural resource practices, while OHA and surrounding communities will teach DLNR staff about the integration of traditional Native Hawaiian stewardship.



An ahū (altar), Wao Kele O Puna. Source: OHA, 2011.

## Brief Timeline

**1845–1855** — The Māhele processes designate Wao Kele O Puna (WKOP) as Government Lands (Kingdom of Hawai'i).

**1911** — WKOP is preserved as part of the Puna Forest Reserve (Territory of Hawai'i).

**1957** — The Admission Act transfers WKOP to the State of Hawai'i to be held in public trust, including the betterment of conditions of Native Hawaiians.

**1981** — WKOP is designated a Natural Area Reserve.

**1985–1987** — State land swap with the Campbell Estate privatizes public conservation lands and allows the development of geothermal energy in WKOP.

**1980s–2000s** — Significant state and federal court cases pertaining to WKOP are filed.

**1990** — More than 1,500 people protest at WKOP in one of the largest protests in state history; more than 140 people are arrested.

**2006–2007** — Pending its sale, the Pele Defense Fund works with the Trust for Public Lands to purchase WKOP. Federal monies and supplementary funds are secured, and title to WKOP is transferred to OHA.

**2016** — Terms of the DLNR/OHA MOA end





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Left: Uluhe fern and 'Ōhi'a in Wao Kele o Puna, Hawai'i. Source: OHA, 2011.

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Left: Uluhe fern and 'Ōhi'a in Wao Kele o Puna, Hawai'i. Source: OHA, 2011.