

Kīpukapuauļu Trail Guide



Hawai'i Volcanoes
National Park

Journey through Kīpukapuauulu, a lush oasis of Hawaiian forest.

This trail reveals a story of struggle and survival for some of Hawai‘i’s rarest plants and animals.

Start/End: Kīpukapuauulu parking area, 1.5 miles up the Mauna Loa Road (trail guide routes clockwise—to your left—at the fork in the trail)

Map: See the center pages of this brochure

Walking distance: 1.2 miles (1.9 km) *round trip*

Estimated walking time: 1–1.5 hours *round trip*

Descent/Ascent: The trail is fairly level, with a few brief inclines and declines

Trail rating: Easy

For your safety and health:

- stay on the trail and avoid earth cracks
- wear walking shoes and carry drinking water
- take protective gear for sun and rain, as weather conditions can change quickly

Air quality:

Kīlauea emits harmful sulfur dioxide gases that can be hazardous to your health. Infants, young children, pregnant women, and hikers with cardiac or respiratory problems are especially at risk. Avoid these fumes and move to areas of clean air.

Other warnings and regulations:

- plant picking is prohibited in this Special Ecological Area (SEA).
- dogs, horses, and bicycles are prohibited on this trail.

Trailhead

Welcome to Kīpukapuauulu, ku‘u ‘āina waokele pūlama (our treasured island of forest).

Kīpukapuauulu is a hot spot of biological diversity, with more native tree species per acre than any other forest in Hawai‘i Volcanoes National Park. The essence of this treasured habitat is captured in its name: kīpuka (island of ancient vegetation surrounded by a sea of younger lava flows), pua (flower), and ulu (growing)—a **fertile oasis of flourishing plants**.

As you prepare to enter this rich kīpuka, whose deepest underlying lava flow is at least 8,600 years old, you will notice a lush forest in front of you. Compare that to the rocky ground and sparse vegetation of the much younger 600-year-old lava flow that currently surrounds you. Kīpukapuauulu is teeming with life.

The wealth of species found in Kīpukapuauulu is supported by more than 10 feet (3 m) of nutrient and moisture-rich soil deposited by Kīlauea Volcano’s many explosive eruptions. The moderate rainfall levels of this mesic forest have also created a suitable habitat for species ranging from the wetter rainforests to the drier woodlands. This rich biodiversity reflects thousands of years of plant succession that has fostered a greater wealth of species.

We invite you to experience this treasured island of native forest. Come and enjoy its beauty and learn about its biological and cultural richness.

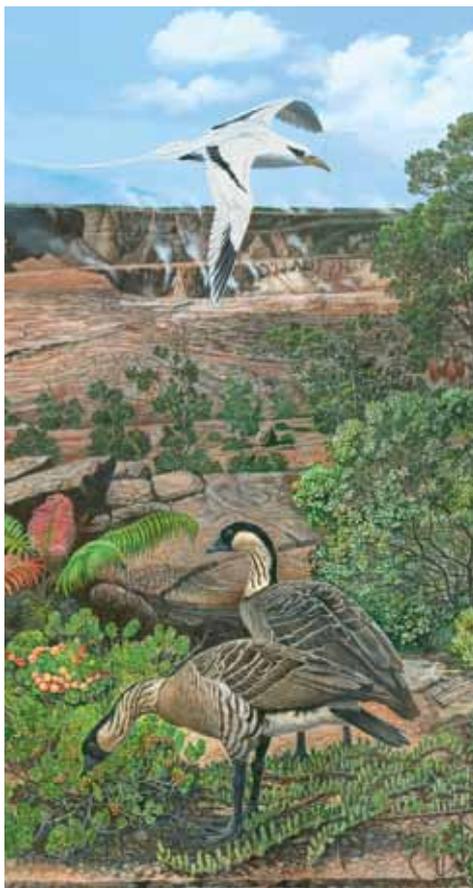


1

You have entered the Wao Akua— the realm of the gods.

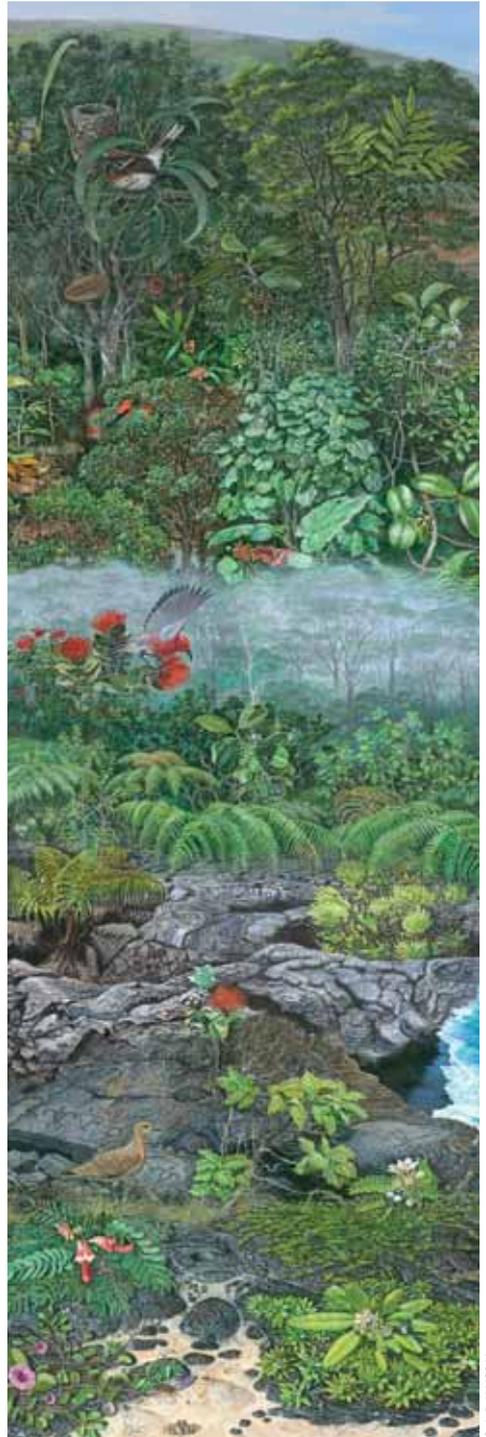
Hawai'i Volcanoes National Park contains many of Hawai'i's most precious resources. For native Hawaiians, the park also envelops many of their wahi la'a (sacred sites), their 'āina hānau (birth lands) and 'āina waiwai (subsistence lands). These areas incorporate not just the physical landscape and its inhabitants, but also the spiritual entities that are believed to comprise and surround them—the akua (gods) and the 'aumakua (guardian ancestors).

Early Hawaiians utilized two primary land boundary systems—one, which partitioned an island into zones of spiritual significance and the other, which divided it and its resources geographically amongst the chiefs and commoners. Crafted generations ago, these two systems acted as a means of balancing an island's spiritual, natural, and human resources in perpetuity. Since subsistence resources were plentiful in some areas while limited in others, it was the kuleana (responsibility) of the residents to maintain them. As long as they were cared for, life was sustained.



The ahupua‘a (land division) boundary system divides an island into vertical land sections that stretch from mauka (mountains) to makai (oceans). Visible landmarks, like mountain peaks, ridges, or ahu (rock cairns), are most often used to delineate the boundaries. Kīpukapuauulu resides in the ‘āina ‘ili (smaller land parcel) of Keauhou within the ahupua‘a of Kapāpala.

The treasured habitat of Kīpukapuauulu is also enveloped within the Wao Akua, the sacred realm of the gods. It is just one of seven (Kuahiwi, Kualono, Wao ma ‘ukele, Wao Akua, Wao kanaka, Kula, Kahakai) such spiritually significant zones that horizontally divides an island. The Wao Akua region is revered for its ancient trees and wealthy seed sources. Where the akua and ‘aumakua reside, life flourishes—life that will, inturn, permeate much of the surrounding lands. Kīpukapuauulu is that wellspring of life supported by the akua and ‘aumakua that embody it.



In the words of Auntie Pua Kanaka‘ole Kanahele: “Kīpukapuauulu is a system of survival, but, more importantly, it is a Wao Akua, a residence of godly existences.”



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“Kīpukapuauulu, the word, conjures up an image of intense, luxurious growth, inspired by the richness of the earth it sits on. A kīpuka is chosen to survive the influx of Pelehonuamea in the form of hot lava as a ho‘omakua or older-generation contributor to this fresh earth. It is also a mokuna, or a land severed from the surroundings of its initial development, and now the benefactor of seeding plants for the bare and naked environment left by the female of the fiery pit. A kīpuka is the DNA of the forest that existed before and the forest that will develop around it. It is the continuum for lives that are born, will grow, procreate, die and sprout again to live another lifetime. A kīpuka is a peek into a living culture.

“Kīpuka displays camaraderie between plant lives—the large trees allowing just enough sunlight to stream through—and they break up the downpour of rain to the plants below. The protected plants will drink drops of sun and rain as prescribed by the canopy. The kīpuka exhibits hundreds of years of survival, a lifestyle forgotten by those life forms that have mobility.

“Kīpukapuauulu is a system of survival but, more importantly, it is a Wao Akua, a residence of godly existences.”

Kīpukapuauulu

Oli created by Pua Kanaka'ole Kanahale

He wahi luana ko nā Kama'aina

The offspring of the land have a place of leisure

Launa'ana i Kīpukapuauulu

Socially existing at Kīpukapuauulu

He 'ohana nō kēia po'e a Laka

These wildwood vestiges of Laka are family

Noho papa i Kīpukapuauulu

Living for generations at Kīpukapuauulu

'O 'Ōhi'a makua ka mua

'Ōhi'a makua was the first

'Ohi ka wai a Lono

Gathers the waters of Lono

'Ohi ka lā a ka Lā

Gathers the heat of Sun

A 'ai i ka mehana a Haumea

And is nurtured in the warmth of Haumea

'O ia ka po'e Koa me ka pua iki

Are the Koa folk with the miniature flowers

'O ka po'e Maile lau li'ili'i

The Maile folk with tiny leaves

'O ka po'e Hau kuahiwi laha'ole

The rare Hau Kuahiwi folk

'O ka po'e Pāpala kepau a kepau'ole

The Pāpala folk with and without resin

He nui, he nui ka po'e wao akua

Many, many are the folks of the godly wilderness

Ulu a'e, ulu mai i Kīpukapuauulu.

Growing near, growing about at Kīpukapuauulu.

2

This revered kīpuka was nearly destroyed by grazing animals.

Much of Kīpukapuauulu has been spared from the continual eruptions of Mauna Loa and Kīlauea volcanoes, allowing native plants, birds, and insects to flourish. But in the late 1700s, well before the establishment of the park in 1916, this paradise was nearly lost, when cattle and feral goats were set loose in Hawai‘i. Having evolved without grazers and lacking the defenses to repel them, many native Hawaiian plants were consumed like ice cream. In Kīpukapuauulu, and much of the surrounding forest, cattle and goats ate everything within their reach, and diversity severely declined. Only tall trees survived their grazing, and alien pasture grasses thrived.

Joseph Rock, a self-taught botany professor, was the first plant explorer to reveal the fragile biodiversity of Kīpukapuauulu in his 1913 book, *The Indigenous Trees of the Hawaiian Islands*. He documented many rare native trees, like the indigenous mānele, or soapberry (*Sapindus saponaria*), struggling to survive in a sterile, city-park-like landscape. In addition to his work, he also undertook the first replanting of rare species, such as the hau kuahiwi, *Hibiscadelphus giffardianus*, and saved it from extinction.



**Joseph Francis Charles Rock
(1884–1962)**

At that time, Kīpukapuauulu was a forest without a future. This “hot spot” of biodiversity was slowly dying. Its once thriving grandparent trees were struggling for survival, with no grandchildren—seedlings or saplings—to succeed them.

To protect this precious kīpuka and what was left of its native plants, cattle were removed in 1928. Goats and pigs were later fenced out in 1968. Since then, Kīpukapuauulu has lost its artificially groomed garden-like appearance but has regained its future as a thriving, self-sustaining, species-rich forest.

The tall, old mānele trees nearby and throughout the rest of this kīpuka now tower above the forest’s rich understory plants. Compare today’s understory to that in the 1913 photo above. What a tremendous difference! Today’s understory is densely packed with not only mānele trees, but also pāpala kēpau (*Pisonia brunoniana*), ‘olopua (*Nestegis sandwicensis*), and other native trees.



© J. F. ROCK / THE INDIGENOUS TREES OF THE HAWAIIAN ISLANDS / COURTESY OF THE NATIONAL BOTANICAL GARDEN



© J. JEFFREY



Bird songs fill the air of Kīpukapuauulu.

If you look and listen closely, you might spot an ‘elepaio, ‘apapane, ‘amakihi, or even the less common ‘i‘iwi. It is for this reason that many began to simply refer to this area as “bird park.” Today we honor this kīpuka with its original Hawaiian name, Kīpukapuauulu.

3

Fast-growing koa trees recover after years of weed control.

In the 1920s, nasturtium was planted to provide a splash of color to this once cattle-ravaged kīpuka. After the cattle were removed, this ordinarily tame non-native garden plant spread wildly throughout Kīpukapuauulu, creating dense, plant-choking mats. These mats prevented native plant seedlings from becoming established—a problem that persists even today if left unattended.



NPS / A. KAWALO-O-KITA

In the 1980s, a summer youth group, working alongside park staff, laboriously hand-pulled every nasturtium plant at this site. Once these overlying mats were uprooted, the dormant seeds



NPS / J. MAKAIKE

of the endemic (found only in Hawai‘i) koa (*Acacia koa*) trees germinated and grew rapidly in the deep soil of Kīpukapuauulu. Now that the nasturtium is being controlled, the koa, along with many other native species are prospering. In 100 years, many of these young koa trees will become the new forest elders, growing up to 75–100 feet (23–30 m) tall and 3–5 feet (1–1.5 m) in diameter—ready to nurture the forest life below them.



© J. JEFFREY



Look for this native butterfly nearby.

Look for Kamehameha butterflies (*Vanessa tameamea*), flitting around the nearby māmaki shrubs. This is one of *only* two native butterfly species found in Hawai‘i.

4

Unlike the now-thriving koa, the ‘ōhi‘a lehua trees are dying of natural causes.

Visitors to Kīpukapuauulu often notice, with great concern, the many large, dying endemic ‘ōhi‘a lehua trees (*Metrosideros polymorpha*). They ask whether their demise is due to a disease or insect that may be spreading throughout the islands. The good news is that the dieback of ‘ōhi‘a lehua trees in Hawai‘i is a natural phenomenon. But what, then, are killing these trees in Kīpukapuauulu? The most likely culprits are simply old age and drought.

‘Ōhi‘a lehua trees colonize new lava flows and ash deposits. As a new generation, they grow up together, mature together, and die together. As these trees age, they lose their ability to handle environmental and biological stresses, such as drought, insects, and disease. The most likely stress affecting Kīpukapuauulu is the high frequency of El Niño droughts that Hawai‘i has been experiencing since the late 1990s. The dieback you see here, and through out the rest of Kīpukapuauulu, is just part of a widespread dieback occurring on the lower slopes of Mauna Loa.



NPS / DAVE BOYLE

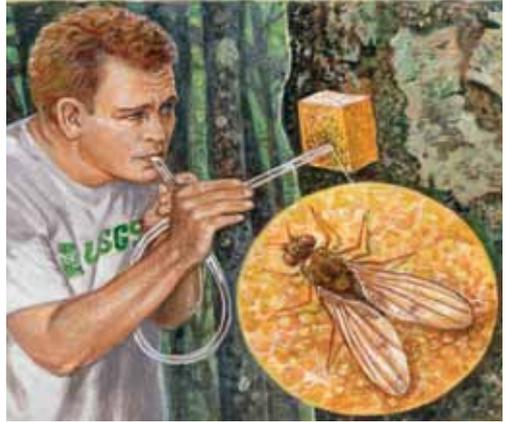
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As the native plants recover, so do many rare species of insects.

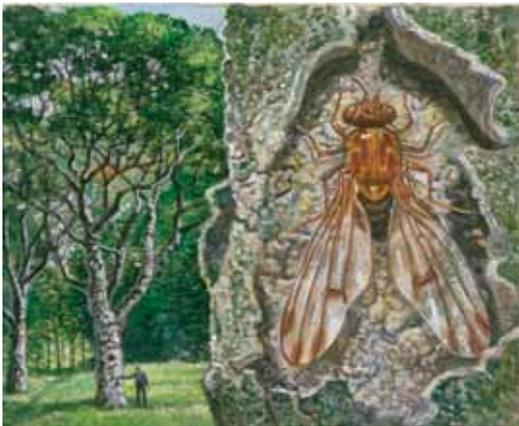
There are currently over 500 endemic species of pomace flies, native only to Hawai'i and found nowhere else in the world.

The elder mānele trees in front of you are the exclusive host plants to two of these small, rare picture-wing flies, *Drosophila mimica* and *Drosophila engyochracea*.

Ecologist Dr. David Foote has been counting the populations of these two flies periodically since the mid-1990s by attracting them to sponges marinated in a concoction of decaying mushrooms. He is encouraged about the future of *Drosophila mimica*, as this species is thriving, by feeding on the rotting fruits of the recovering mānele trees.



© J. DAWSON



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It is a much different story for the *Drosophila engyochracea*, whose populations have plummeted in the last three decades. Very few flies have been observed since 2007. The villains of this story are alien predators, including yellow jacket wasps and, possibly, a newly arrived spider that lives

in the bark of these mānele trees. As predators of the *Drosophila engyochracea*, they are eating this species to extinction.

Dr. David Foote shares his knowledge about insect life in Kīpukapuauulu with his son, long-time Junior Park Ranger Sam:

“Dad, what native insects live in Kīpukapuauulu?”

Kīpukapuauulu is rich with native insects and spiders. In fact, it has one of the highest diversity of native insect species in the park. There are endemic long-horned beetles, picture-wing fruit flies, and Kamehameha butterflies. Butterflies are more common, now that their host plant, the māmaki has replaced the weeds in many areas of this forest.

“Why are insects important to a forest?”

Insects contribute to both the forest and to other, animal species. They are decomposers—they dispose of a forest’s garbage by chewing it up and turning it into soil. They are also pollinators as well as prey for many of our native forest birds.

“Why are there so many native insects here and why now?”

It’s because there are many more native plant species in this kīpuka than in other locations. When I first started working here in the 1980s, this kīpuka was overrun by escaped ornamentals, like Jerusalem cherry. I came here to study the Mediterranean fruit fly, a world-wide agricultural pest that infests the cherries. Kīpukapuauulu used to have the highest densities of “medflies” in the state. The park, since that time, has restored much of the native vegetation here, which has fostered and protected much of the endemic insect species that depend on Hawaiian host plants for survival. People from all over the world can now come and see this. It is one of the reasons why the park became a World Heritage Site.

Kīpukapuauulu Trail Map

Help us preserve Hawai'i Volcanoes National Park for the enjoyment of present and future generations. Do not collect or damage any natural, cultural, or geological features while in the park.

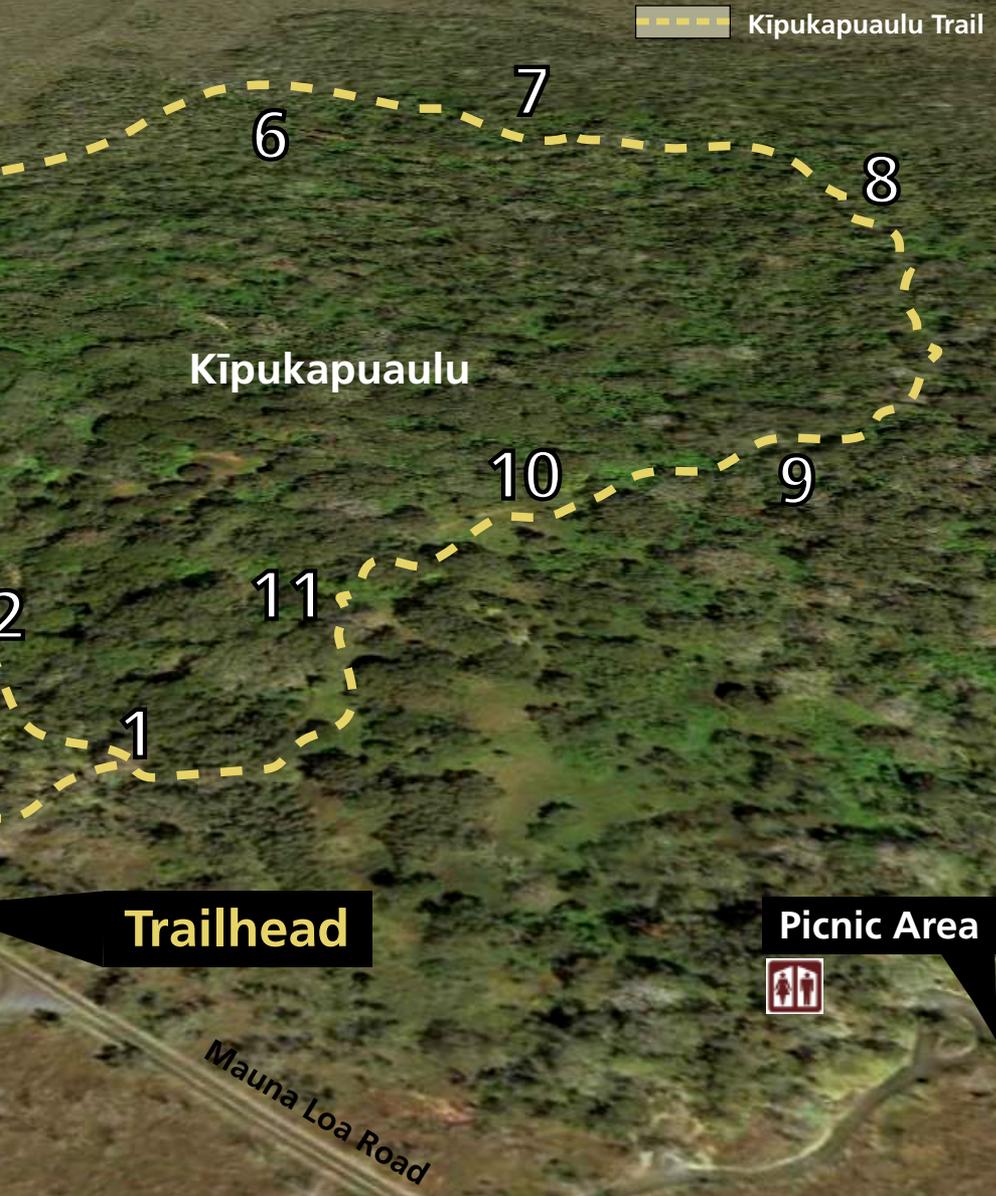
E mālama i kēia 'āina kaulana. Please help protect your park . . . Take only photographs and leave only footprints.

From the Highway 11:
To Kīpukapuauulu—1.5 miles (2.4 km)
To Mauna Loa Lookout—11 miles (17.7 km)



TRAIL STOPS

Numbered posts in the forest indicate stops described in this guide.



Trailhead

Picnic Area



Mauna Loa Road

6

Skylights provide a glimpse into the hidden foundation of Kīpukapuauļu.

Under this lush forest lies a foundation—a body of pāhoehoe lava overlain with centuries of volcanic ash. Formed within the body of pāhoehoe lava flows are lava tubes—volcanic caves that were once filled with molten lava. This lava tube is at least 8,600 years old. While active, it once transported lava over great distances, from its eruptive source to its most distal reaches. Skylights are holes in a lava tubes roof where the ceiling has collapsed, leaving an opening like the one we see here. This lava tube was formed during one of Mauna Loa’s many eruptions.

Unlike the Nāhuku lava tube, which can be found along the Crater Rim Drive, entry into this lava tube is discouraged, as it is a safe haven for unique plant and animal species and very delicate geological features. It was in this lava tube, in 1971, that the first cave-adapted animal species in Hawai‘i, was discovered. One such species unique to these dark and often

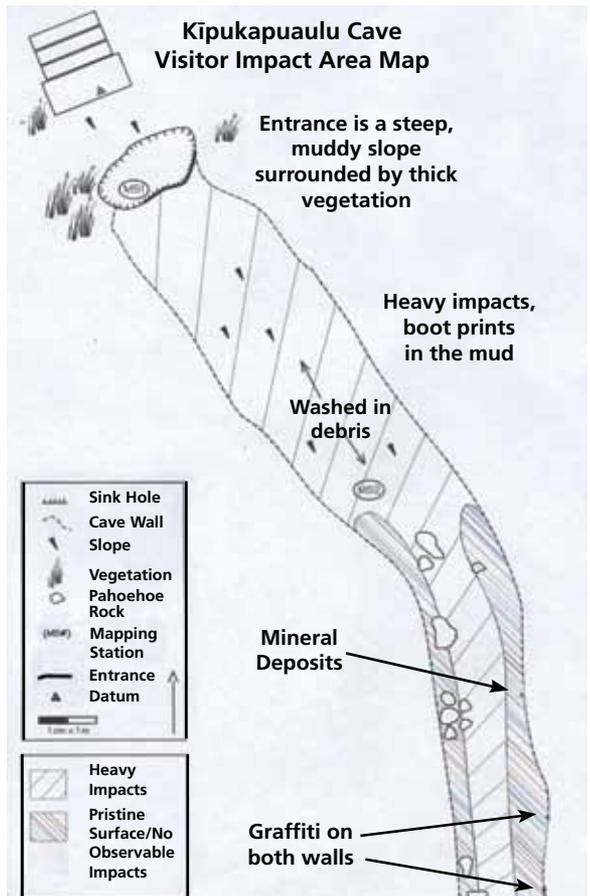
damp lava tubes includes the small-eyed, big-eyed hunting spider (*Lycosa howarthi*) (left). This endemic spider, along with other insects like the millipedes (*Nannolene*) and the lava tree crickets (*Thaumatogryllus cavicola*), continue to call this fragile lava tube home.



Lava tubes weren't only a home to insects. They were also used by native Hawaiians as shelters, storage areas, and water catchment sites. Gourds were placed in lava tubes to catch filtered rainwater for drinking. Some lava tubes—those that were used as burial sites—remain sacred. Others are still used as shelters from strong winds, heavy rains and heat—a lasting legacy to the ingenuity of native Hawaiian people.

Throughout time, some of these delicate environments have either been destroyed, damaged by graffiti, or vandalized. Because of this, the Cultural Resources Management Division has undertaken the important task of mapping and monitoring many of the park's lava tubes. Their goal is to establish a baseline survey of a lava tube's condition and contents and monitor changes to it over time.

Kīpukapuauulu lava tube was first mapped in 1992. Subsequent monitoring and remapping was completed in 2001 and 2005. As you can see on the map (right), this lava tube has already sustained both heavy impacts and graffiti. To prevent any additional damage, visitors interested in lava tubes are encouraged to visit Nāhuku Lava Tube.



7

The future of the ‘ōhi‘a lehua tree can be read in the forest gaps of Kīpukapuauļu.

‘Ōhi‘a lehua are the most abundant and important trees in Hawai‘i’s forests. They are found on the main Hawaiian islands, from shoreline to alpine treeline. During their lifetimes, ‘ōhi‘a lehua trees provide food to animal species, like the nectar-feeding native birds. They also become nurse logs after dying and nurture new plant growth.

After succumbing to natural dieback, these ancient trees fall to the ground, crushing many of the smaller trees and understory plants beneath them. This process, however, allows additional light to enter all the layers of the forest. The influx of light creates an opportunity for young ‘ōhi‘a lehua seedlings, which have taken root on nurse logs, to flourish. These young seedlings can grow, fill the gap in the canopy, and become the next forest giants. Fortunately, for these slow-growing trees, their resilient seedlings can persist for many years on nurse logs, ready to take advantage of a new light gap in the forest’s canopy.



NPS / DAVE BOYLE



NPS / A. KA'AWALO-A-OKITA

What do you think are the chances that these slow-growing, light-hungry ‘ōhi‘a seedlings will thrive in this small forest gap? Notice that there are other, faster-growing plants, like the endemic pilo (*Coprosma rhynchocarpa*) and māmaki (*Pipturus albidus*), and the indigenous purple-flowered koali‘awa (*Ipomoea indica*)

vine rapidly closing the gap? Once the shade-tolerant mānele or pāpala kepau trees replace the pilo, māmaki, and koali‘awa, the chances for ‘ōhi‘a lehua to thrive are grim—at least, until there is a kīpuka-wide disturbance, such as a hurricane or eruption?



© R. HAZLETT



Watch for Kalij pheasants roaming the forest floor.

This game bird, introduced in 1962, has become abundant on Hawai‘i Island. The male pheasant is black, the female, brown. Kalij



NPS / DAVE BOYLE

eat and disperse some native plant seeds. Unfortunately, they not only chew up native plant seedlings but disperse non-native plants and dig up the soil, enabling weed growth. Watch for them and look for their effects on the kīpuka.

8

The forest floor of native ferns and herbs is also recovering.

While celebrating the recovery of native trees in Kīpukapuauulu, park managers also rejoice in the successful return of the native understory shrubs, ferns, and herbs. In this 1921 photo of Kīpukapuauulu, only a grassy cattle pasture remains beneath

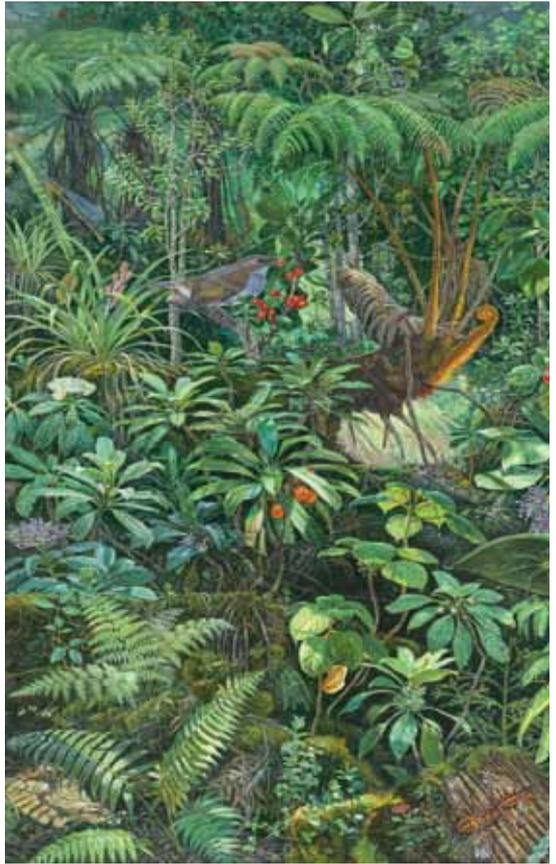


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a canopy of grandparent trees. Absent are the young trees and native forest floor plants beneath them. Had those conditions continued, Kīpukapuauulu would have looked much different today. Today's understory is flourishing.

The recovery of the forest floor plants has not only increased the diversity of native plants here, but also restored plants of cultural significance, like the endemic 'ala'alawainui (*Peperomia cookiana*), the indigenous palapalai fern (*Microlepia strigosa*), and the common kupukupu swordfern (*Nephrolepis exaltata and cordifolia*). Without question, much of Hawai'i's extraordinary plant life plays an essential role in the Hawaiian culture. 'Ala'alawainui is widely used by native Hawaiians for its medicinal value. Palapalai and kupukupu are most commonly haku (braided) or hili (plaited) to create lei for hula—lei po'ō

(lei worn on the head), lei ‘āī (lei worn on the shoulders), and lei kūpe‘e (lei worn as a bracelet around the wrists and ankles). These, and other plants, are meticulously collected and offered as ho‘okupu (spiritual gift) to the goddess Pelehonuamea or placed on the sacred kū‘ahu (hula altar) in honor of the goddess Laka—the ‘aumakua to whom hula practitioners pay homage. These now thriving, culturally significant plants are the most common species found in the returning understory of Kīpukapuauulu.



© J. DAWSON

Note: It is illegal to pick, collect, or remove plant and/or plant parts from Kīpukapuauulu, a sacred Wao Akua and Special Ecological Area (SEA). Violators will be prosecuted under federal law.



Koa discovery

Mature koa trees are easily recognized by their sickle-shaped phyllodes (leaves). The leaves of young koa are much different—made up of many tiny leaflets. As you continue your journey, look for a koa planting with both forms of leaves.



NPS / DAVE BOYLE

9

The trail through this “veritable botanical oasis” was built by the hard-working CCC “boys.”

Access to Kīpukapuauulu prior to the establishment of Hawai‘i National Park on August 16, 1916, was limited, as it was a part of a much larger privately owned cattle ranching and commercial koa harvesting enterprise. It wasn’t until 1934 that the Kīpukapuauulu trail was constructed by the hard-working “boys” of the Civilian Conservation Corps (CCC)—a program established by President Franklin Delano Roosevelt in 1933. This emergency work program was implemented to provide economic relief for American families from the Great Depression by employing young men during a time when jobs were scarce. Working alongside skilled laborers, these “boys” became known as Roosevelt’s “Tree Army”—then, the most effective large-scale environmental program in the nation.

Several camps were opened through Hawai‘i. The largest camp on the island of Hawai‘i was built in Hawai‘i Volcanoes National Park (1934–1942). It housed some 200 young men that, while working and living in the park, accomplished many great tasks—establishing much of the Park’s early infrastructure. One such project included the construction of the Kīpukapuauulu trail. They later followed that with several additional projects aimed at invasive grasses removal, tree seedling plantings, and tree identification—all a testament to the significance of Kīpukapuauulu as a “veritable botanical oasis.”



NPS / HAWO ARCHIVES

10

Park resource managers continue a long tradition of restoration.

Twenty years ago, despite the removal of grazing animals, many parts of Kīpukapuauulu (approximately 1/4 of the kīpuka) remained a treeless grassland, choked by invasive blackberry (*Rubis argutus*) and

alien pasture grasses. To encourage restoration, today's resource specialists, like those that preceded them, continue to remove the invasive blackberry and grasses that litter the forest. This has allowed the native plants to recover naturally. Where native trees didn't recover, even after repeated weed-removal efforts, fast-growing native trees and shrubs were planted. Once these faster growing plants matured and created shade, other shade-tolerant native understory species were planted below them. Although the threats of volcanic activity or wildfire are always present, hard-working resource specialists continue to care for this flourishing native forest.



NPS / HAVO ARCHIVES

“Pipī ka wahie, ho‘onui ka pulupulu”

With persistence comes success

Hawaiian proverb



NPS / DAVE BOYLE



You can help?

Volunteers play a critical role in restoring Hawai'i's native ecosystems. They have planted some 12,000-14,000 native plants in the park. Visit <http://www.nps.gov/havo/supportyourpark/> to see how you can help.

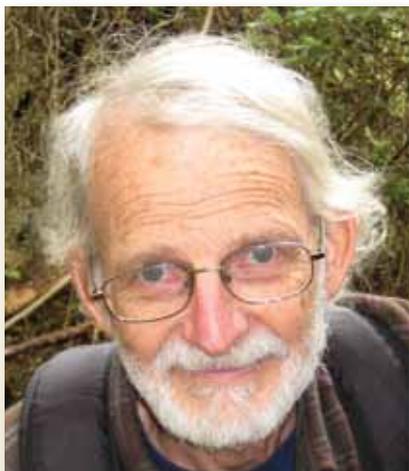
Under the direction of Tim Tunison, retired Chief of Resources Management, the park made great progress in restoring Kīpukapuauļu.

Designating Kīpukapuauļu back in 1985 as the park's first Special Ecological Area was, in my mind, a

no-brainer. It has a richer variety of tree species than any other forest stand in the park. Recovery was underway when it was fenced to exclude cattle, goats, and pigs so we were confident that we could further restoration. Just as important, Kīpukapuauļu had a short, popular trail and we could share its biological riches and its restoration story with our park visitors.

Over the many years of working in Kīpukapuauļu, I have become quite attached to this place. I am proud of what we have been able to accomplish. We have removed invasive plants that threatened to turn this forest into just another weed patch, and now we see keiki (young trees) everywhere. We have converted the old cattle pasture in the middle of the kīpuka to a thriving forest. I especially enjoy walking around in the forest and seeing plantings of all the rare species, saved from extinction, growing tall, and even some already setting fruit for a new generation. Successful restoration of this kīpuka shows that, with knowledge and, of course, lots of hard work, there is hope for other Hawaiian ecosystems. The recovery and restoration of Kīpukapuauļu was one of the most satisfying things about my 23 years of working in Hawai'i Volcanoes National Park.

—Tim Tunison



NPS / A. KA'AWALO A. OKITA

11

Rescued from the brink of extinction, the hau kuahiwi is the crown jewel of Kīpukapuauulu.

The rarest plant in Kīpukapuauulu is the hau kuahiwi (*Hibiscadelphus giffardianus*). This large-leaved, relatively small tree has long, curved flowers that suggest pollination by a curve-billed Hawaiian honeycreeper. In 1911, Joseph Rock was shown a single, cattle-ravaged hau kuahiwi plant on the edge of Kīpukapuauulu. He described it as a new species and commented that “it is unique among all Hawaiian plants, and the author is sorry to relate that nothing has been done to protect it.”



HIBD / CARNEGIE MELLON UNIVERSITY

Sadly, that lone tree died in the summer of 1930, but not before seeds were collected and propagated by volcano resident W.M.

Giffard (for which this plant was named). Early records revealed that Giffard’s efforts successfully yielded at least one surviving tree, whose offspring were later replanted here between 1951–1964. By 2001, after continued propagation efforts, researchers were able to reintroduce more than 200 trees to both Kīpukapuauulu and Kīpuka Kī. These reintroduction projects continue today as part of an effort to stabilize many of the park’s rare plant species. Through combined efforts, many of these trees have survived and some have even set fruit—a recent recovery to be celebrated.



NPS / DAVE BOYLE

In the last 10 years, over 1,000 individuals of 10 other rare plant species have been planted in Kīpukapuauulu. Although some of these species haven’t yet produced seedlings, many are thriving.

Conclusion

Kīpukapuauulu is now well on its way to recovery and restoration.

Kīpukapuauulu was a forest without a future in the early 1900s; today it tells a very different story. Many of the native plant and animal species that were thought to have been lost are now



NPS / A. KA'AWALO-O-KITTA

recovering, with the help of fences and alien plants control. In spite of this, the final chapter has not yet been written. Weather, fire, volcanic eruptions, and new invasive species continue to threaten the viability of this kīpuka. Invasive species, a world-wide challenge, especially threaten these unique native forests. Also, the full expression of plant and animal biodiversity has not yet been restored.

Some species continue to struggle for survival—challenges that resource specialists hope to solve by continuing to care for this—ku‘u ‘āina waokele pūlama—treasured island of forest.

From the time of the ancient native Hawaiian practitioner, who believed this to be the home of their akua and ‘aumakua, to nearly a century of botanists and foresters, Kīpukapuauulu has captivated its visitors with its biological wonders, beauty, and tranquility. As Charles Kraebel, Assistant Superintendent of Forestry for the Territory of Hawai‘i, said in 1922, “There is always some otherwhere whose charms seem not to have been sufficiently heralded. Such a spot is the Kipuka Puauulu. . . .”

Glossary

- Alien species:** Plants and animals brought to Hawai‘i by humans.
- Biological diversity (Biodiversity):** The number of different species found at a particular location. Biodiversity is often used to measure the health of a plant community.
- Canopy:** The highest layer of the rainforest that is usually dominated in Hawai‘i by either the ‘ōhi‘a or koa species.
- Endemic:** Native species found only in Hawai‘i.
- Indigenous:** Native species found both in Hawai‘i and elsewhere in the world.
- Invasive species:** Widespread non-native species that adversely affects a native habitat.
- Mesic forest:** Ecological zone that experiences moderate levels of rainfall, ~60 inches, per year.
- Native species:** Plants and animals that arrived in Hawai‘i without human assistance.
- Polynesian introduced species:** Plants and animals brought to Hawai‘i by voyaging Polynesian for food, fiber, and medicine.
- Rare species:** Uncommon or scarce species.
- Succession:** The coming of one organism after another in order or sequence.
- Understory:** The layers of shrubs and plants growing beneath the main canopy of a forest.

For more information

To learn more about wonders of Hawai‘i Volcanoes National Park, visit our web site: www.nps.gov/havo.

To read more about Kīlauea and Mauna Loa Volcanoes, go to the USGS Hawaiian Volcano Observatory web site: www.hvo.wr.usgs.gov.

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