

The last national forest created under the authority of the Weeks Act was the Finger Lakes National Forest in 1983. Conservationists in Hawai'i hope to mark the centennial of the Weeks Act by creating a new national forest from a combination of private and public land.

THE LESSONS OF HISTORY

MAKING A CASE FOR A NATIONAL FOREST IN HAWAI'I

For the Hawaiian forest, 1903 was a watershed year. After more than a century of massive forest loss and destruction, the Territory of Hawai'i acknowledged that preservation of the forest was vital to the future economic prosperity of the islands. On April 25, 1903, urged by sugar growers and government

foresters concerned about the vanishing woodlands, the Territorial Legislature passed Act 44, which created Hawai'i's forest reserve system and became the basis for the largest public-private partnership in the history of the Islands. It was the beginning of a new attitude toward Hawai'i's forests, and a new determination to protect them. In 2003, conservationists celebrated the 100th anniversary of Act 44 as the Year of the Hawaiian Forest—by remembering the past and the lessons it holds for our own future. They hope to mark the centennial celebration of the Weeks Act by creating a new national forest for the same reasons John Weeks envisioned—watershed protection and enhanced recreation.

THE FIRST HAWAIIANS

The history of forest management and change in Hawai'i began with the ancestors of Hawaiians voyaging from the Marquesas, 2,500 miles away, in the fourth or fifth century A.D. They found an archipelago of high islands rich in forest cover, with lush windward valleys in which to make a new home. They brought animals such as dogs, chickens, and a small variety of pig for food, as well as staples like breadfruit, sugar cane, taro, and sweet potato. While they may have inadvertently brought the Polynesian rat and

geckos, they deliberately introduced the kukui, mountain apple, ti, and other “canoe plants” they relied on for various things.

The early Hawaiians used fire to clear forests on the lower arable slopes to plant crops, and constructed fishponds and taro patches in large, wet valleys. They hunted birds for food and ceremonial feathers. Several flightless birds, including endemic species of geese, ducks, and rails, were hunted to extinction, while other species declined from the combined effects of habitat destruction, hunting, and predation by rats and dogs. The lowlands became the *wao kanaka*, the realm of people, and agriculture and settlements replaced the native landscape.

Despite the agricultural changes to Hawai'i's lowland areas, the early Hawaiians took care to protect the upland forests, which they viewed as *wao akua*, or the realm of the gods. The *ahupua'a* system of water and land management, under which land was managed drainage by drainage from the highest to lowest elevation, protected the upland water sources that sustained human life in the lowlands. Further, the Hawaiian *kapu* system served to protect all natural resources, and over time, the Hawaiians instituted a system of sustainable management in which no one took from the land more than was needed.

BY JOHN HENSHAW AND JAMES G. LEWIS

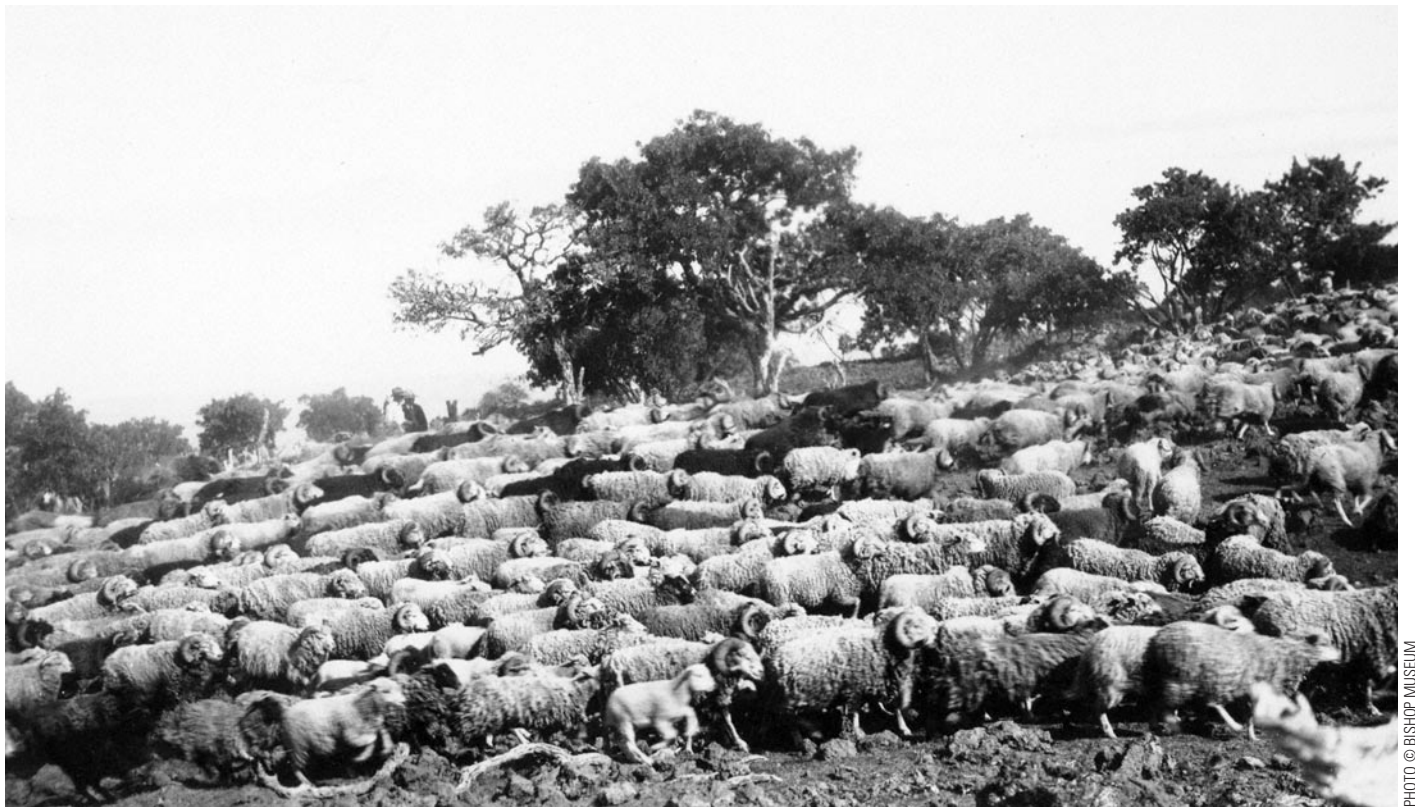


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Sheep and other livestock introduced by western contact were allowed to multiply and roam unchecked and cause considerable damage throughout the islands during the nineteenth century.

Between 1100 A.D. and 1650 A.D., rapid population growth put increased pressures on the land, including accelerated clearing of lowland forests, more terracing of slopes, large-scale construction of irrigation systems and fishponds, and the cultivation of drier, marginal lands. By the time of Captain James Cook's arrival in the Hawaiian Islands in 1778, much of the original lowland forest had been greatly altered by more than 1,000 years of intensive agriculture, while upland systems were impacted by introduced animals, especially the Polynesian rat.

THE ERA OF SANDALWOOD AND CATTLE

Following European and American contact, changes to the Hawaiian environment accelerated and spread into the mountains. Sandalwood, exported to China for its fragrant aroma, became the islands' first cash crop. Millions of trees were harvested from the mountain forests, but the real damage was to Hawaiian society and community structure. Land management principles that had been developed and maintained over the previous millennium were replaced with an extraction-focused approach that disregarded long-term health of watersheds and complex social systems. The men of the farming class were forced to cut trees, first on the lower slopes and then farther up into the mountains, to pay for the chiefs' acquisitions of European weapons, warships, and imports.

The damage done to the Hawaiian forest by the harvesting of sandalwood, however, was minor compared to what was to come. Livestock brought by westerners—the European boar and larger varieties of pigs, goats, sheep, and cattle—severely denuded the forests on all the islands. Cattle, for example, were introduced by Captain George Vancouver in 1793 and allowed to multiply unchecked throughout the uplands, consuming and trampling vegetation.

As shipping increased, demands for firewood and grazing land continued to degrade upland forests. Trading ships brought non-native songbirds and mosquitoes, introducing a key vector of avian malaria and pox to Hawai'i's native birds, which were soon eliminated from the warm, moist lowlands of all the islands. This deadly avian epidemic was perhaps the single most important factor in the extinction of native forest birds in the islands.

By the mid-nineteenth century, the islands' cattle and goat populations numbered in the hundreds of thousands. Forest destruction above Honolulu was so great, it had all but stripped Nu'uaniu Valley of its cover, stirring concerns about the city's future water supply.

NO FORESTS, NO WATER, NO SUGAR

The relationship of our forested uplands to a dependable supply of clean water was recognized as early as 1860, when sugar planters became aware that protecting the forests as watersheds was vital to their industry. As sugar overtook cattle as an economic force in the Hawaiian Islands, the influence of the planters in government increased. In 1876, legislation was passed to "set apart and cause to be protected from damage by trespass of animals or otherwise, such woods and forest lands, the property of Government, as may...be best suited for the protection of water sources."

In 1892, the Bureau of Agriculture and Forestry was established. In 1903, with the support of the Hawaiian Sugar Planters' Association, the Territorial Legislature passed Act 44, calling for a division of forestry with authority to establish forest reserves. Under the guidance of Ralph Hosmer, Hawai'i's first territorial forester (1904–14), a quarter of the land area of Hawai'i was placed in the forest reserve system. The early part of the twentieth century in Hawai'i was marked by a massive reforestation effort. The first



Grazing by cattle destroyed hundreds of thousands of acres of native forest, including this high elevation forest on Hawai'i Island.

decade saw the establishment of 37 forest reserves comprising nearly 800,000 acres of state and private land. A primary management goal was the exclusion of livestock from the native forests. The effort was expanded in 1907 with a hunting license program, which enlisted the help of the general public. Along with the fencing and elimination of feral livestock came tree-planting and fire-control programs.

Reforestation reached a peak in the late 1930s, when nearly two million trees were planted annually in the forest reserves. Although these efforts were well meaning, most of the trees were fast-growing species (such as eucalyptus) that were non-native. While these introduced trees and shrubs have prevented catastrophic destruction, they have crowded out many native species that made up the mid and understory of the native forests.

By the advent of World War II, the forest reserve system included 1.2 million acres, more than a quarter of the islands' entire landmass. Of that total acreage, 65 percent of the land was ceded lands, turned over to the Territory of Hawaii, with much of the remainder privately held by individuals or families. Most severely eroding areas had been reforested, and feral livestock numbers were reduced to more manageable levels. Water was still the most important product of the forests, but the potential to provide other goods and services such as erosion control had been recognized.

A NATURAL HERITAGE WORTH PRESERVING

In the second half of the twentieth century and the first years of the new millennium, the Hawaiian forest has seen both gains and losses.

In the 1950s, several new species of game birds, deer, and mouflon sheep were introduced for recreational hunting, and their presence has contributed to the continued degradation of the

native forest. During the 1960s, a new reforestation effort resulted in the planting of seven million seedlings, and in 1961 a greenbelt law established two new land use categories, urban and agriculture, with forest reserves designated as "conservation districts."

Growing concern about Hawai'i's unique natural ecosystems led to the creation of a statewide Natural Area Reserve System in 1970, and a similar concern for Hawai'i's native plants and animals led to the passage of groundbreaking endangered species legislation in the 1980s and 1990s. Today, Hawai'i has the 11th largest state-owned forest and natural area reserve system in the United States, which encompasses 700,000 acres. This is augmented by an equal amount of forestland in private ownership and an additional 150,000 acres under federal jurisdiction, including national parks and wildlife refuges.

The long-standing policy of watershed protection has resulted in dramatic improvements from the degraded conditions that prevailed at the turn of the twentieth century, but much work is still needed. The major threat to the Hawaiian forest is no longer logging or cattle ranching, but feral animals such as pigs and invasive weeds like miconia. Half of the islands' unique tropical forests are already gone, and with them many of their native plants and animals. Nearly three-quarters of the nation's documented plant and bird extinctions are from Hawai'i.

Existing control efforts to limit new weed introductions and contain existing infestations are not adequate, and growing international traffic to Hawai'i brings new threats such as the brown tree snake, which has decimated bird populations on other Pacific islands. Moreover, within the next 25 years, the state may run out of drinking water—yet we no longer have a well-funded watershed management program to ensure our future water supply. Public investment in watershed management has diminished, and our forested watersheds are degrading.



PHOTO © BISHOP MUSEUM

Massive public-private investment in reforestation during the early twentieth century replenished the water supply and fueled the era of plantation agriculture in Hawai'i.

Eleven years into the twenty-first century, the future of the Hawaiian forest is again at risk. A decade of chronic budget shortfalls has left state forest managers struggling to sustain watersheds, battle the nation's worst extinction crisis, and stem a silent invasion of alien plants and animals. If the Hawaiian forest is to survive for future generations, new public-private partnerships are needed, much as they were a century ago.

HAWAII'S UNIQUE RESOURCES

The Hawaiian Islands are a uniquely diverse place on Earth. Hawai'i is the world's most isolated high island archipelago and was one of the last places on Earth to be discovered and colonized by humans. The extreme isolation of the islands produced, through evolution and speciation, a remarkable diversity of species that are found nowhere else on the planet. Approximately 1,033 plant species, 10,000 invertebrates, and 140 birds are native to the Hawaiian Islands, of which 87 percent of the plants, 95 percent of the invertebrates and 100% of the forest birds are endemic (found nowhere else on Earth). These natural treasures are integral elements of the biological and cultural heritage of the Hawaiian Islands and their people. Hawai'i has also seen extraordinary rates

of extinction and endangerment. More than 265 species of the Hawai'i biota have gone extinct. Extinctions continue at a rate of at least one species per year. In the last three decades alone, several of Hawai'i's endangered forest bird species have disappeared—in all likelihood, lost forever to extinction. Currently, there are 317 species federally listed as threatened or endangered. An additional 109 are listed as candidate species and species of concern. There is a tremendous need for research that is targeted towards solving resource management issues.

THE FUTURE OF FOREST CONSERVATION

As Hawai'i's extinction crisis accelerated in the closing decades of the twentieth century, natural area managers began looking for ways to dramatically increase their protection efforts. The practice of setting aside individual forest parcels—whether as state forest reserves, private nature preserves, or national wildlife refuges—was not enough. Threats such as feral pigs and invasive weeds did not respect parcel boundaries. To be truly effective, forest protection needed to occur across ownership lines, involve public and private landowners, and serve economic and environmental interests—just as it did at the turn of the twentieth century.



PHOTO © BISHOP MUSEUM

Reforestation efforts reached a peak in the 1930s, when nearly 2 million trees were planted annually in the forest reserves. Most of the trees were fast-growing non-native species that produced sparser forests than the complex forests created by native species.

In 1991, a model for large-scale forest protection was pioneered on East Maui. That year six public and private landowners and the county government formed the East Maui Watershed Partnership, a cooperative effort to protect a 100,000-acre forest ecosystem that is the island's primary source of water. Recognizing that they shared preservation of the watershed as a common interest, the partners agreed to pool resources and implement an active watershed management program across the entire East Maui landscape.

Today, after more than a decade of hard work, the East Maui partnership has become the prototype for large-scale forest protection efforts in Hawai'i, and its success has spurred the formation of similar watershed partnerships across the state. To date, more than 2 million acres of watershed and conservation lands in Hawai'i have been protected within these unique public-private partnerships. In the fight to save the Hawaiian forest, they represent the best hope for the future.

THE NEED FOR A NATIONAL FOREST

Despite Hawai'i's incredible forest resources and a U.S. Forest Service presence, it remains one of only a few states in the union with no national forest. The federal government does not own fee simple land in Hawai'i under Forest Service National Forest jurisdiction. However, the Forest Service does hold more than 11,000 acres in conservation easements. Existing conservation easements could form the basis for a national forest in Hawai'i. Unlike traditional national forest management, which requires intensive federal staffing, this model could draw on the strong existing partnerships found in Hawai'i for on-site management.

This partnership concept already is being tested at the Hawai'i Experimental Tropical Forest, which is jointly managed by the

Forest Service and the state. It also can be seen in practice at Wao Kele o Puna (another Forest Service funded purchase; 25,000-plus acres under the Forest Legacy program), which is managed by the state and its Office of Hawaiian Affairs, and at Kona Hema, where 8,000 acres are owned in fee by The Nature Conservancy (TNC) under Forest Legacy conservation easements. Several large landowners who have historically managed forest lands for grazing and ranching are now interested in selling land. The combination of reduced land prices and a sympathetic private sector presents a rare opportunity for the Forest Service to make purchases of important forested lands that could help the return of large areas of the native Hawaiian forest. More than 80,000 acres on Hawai'i Island alone could provide potential national forest opportunities.

GOALS AND OBJECTIVES

The creation of a national forest in Hawai'i would yield the following benefits:

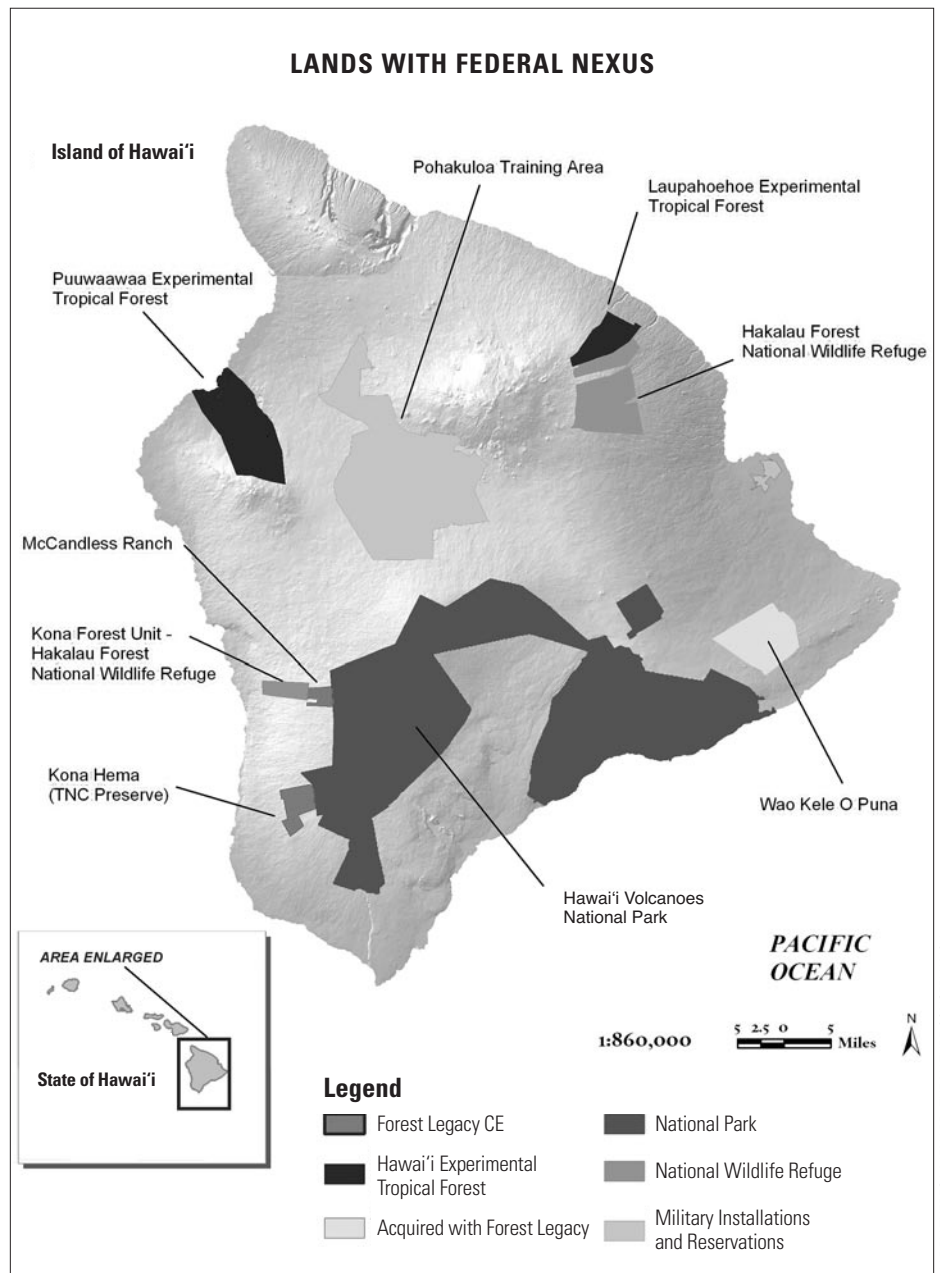
- **The return of the native Hawaiian forests:** More than 85 percent of the major Hawaiian islands were covered by native forestland at pre-human contact. Today, more than half of those forestlands have been lost because of development, ranching, agriculture, and invasive weeds. A major effort is needed to maintain the existing forests against the many threats that face it and to return a portion of the lost lands to productive, sustainable forests. The Forest Service could play a substantial role in this undertaking.
- **Research and demonstration:** For Hawai'i to develop a sustainable forest management system, there is a great need for additional research and demonstrations of how sustainable tropical forestry operates on the ground. The Forest Service could play a major leadership role through its

Research Branch and a National Forest presence in Hawai'i.

- **Ecosystem services:** The Forest Service is currently providing national leadership in understanding the ecosystem services that are provided by a forest, and commercial markets that could be developed around these services. Tropical forests are well-known for their international importance in providing ecological services. The development of Forest Service leadership in tropical forest management in Hawai'i would draw on and recognize the agency's leadership in developing values for ecosystem services.
- **Improved fire management:** Fire did not constitute a major natural process in native Hawaiian forest ecology. Hawai'i's native plants did not evolve with fire. However, with the large number of non-native invasive plants entering the system in Hawai'i, native Hawaiian habitats are devastated by wildfires. There is a strong need for fire management skills in Hawai'i. The Forest Service is the national leader in fire management, and its skills and involvement are needed in Hawai'i at a higher level. The creation of a national forest in Hawai'i would provide this resource.
- **Improved access:** In native Hawaiian culture, the upper forests of Hawai'i were off limits to all but a few. This situation continues today due to very limited physical access to Hawai'i's upper forests. Better road and trail systems are needed to improve access for the public in appropriate places. The Forest Service has a long history and excellent expertise in this area.

Over the last century, the Weeks Act has brought millions of acres of valuable and cherished land in the contiguous United States under federal management. Although land conservation measures in Hawai'i predate the Weeks Act, management issues there have become complicated and costly enough that federal intercession is now needed, just as it was needed to save the eastern forests one hundred years ago. □

This article was compiled by James Lewis from reports and papers written by John Henshaw and others for The Nature Conservancy in Hawai'i, where John is the director of Land Protection and Conservation Partnerships. Both would like to thank Jody L. Kaulukukui for her help with this article.



A new national forest would potentially combine land from several public and private sources, though not necessarily all of those shown here.

FURTHER READING

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MAP BY THERESA MENARD, THE NATURE CONSERVANCY