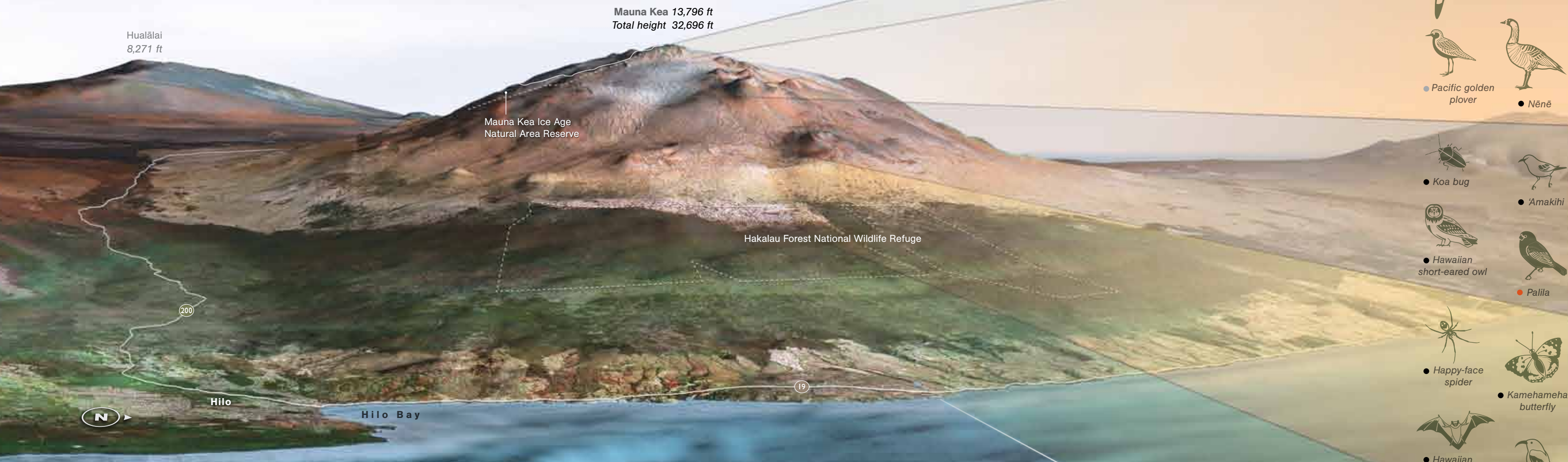


Mauna Kea

THE WORLD'S TALLEST MOUNTAIN

It snows in the middle of the Pacific on the summit of this volcanic colossus, so the Hawaiians who built shrines on its broad flanks named it Mauna Kea, "white mountain." Its nearly 14,000-foot climb above sea level is commanding, but nothing for the record books. What makes this the world's tallest mountain is its total elevation—32,696 feet—most of it underwater. Mauna Kea rises directly from the seafloor, built by lava from a volcanic hot spot that, island by island, created the Hawaiian archipelago.



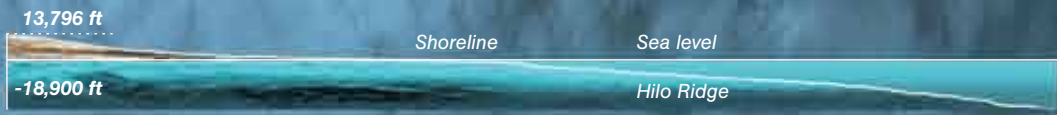
Hualālai 8,271 ft
Mauna Kea 13,796 ft
Total height 32,696 ft

Mauna Kea Ice Age Natural Area Reserve

Hakalau Forest National Wildlife Refuge

Hilo Hilo Bay

Mauna Kea 32,696 ft



Mauna Kea profile without vertical exaggeration

Mauna Kea Versus Mount Everest

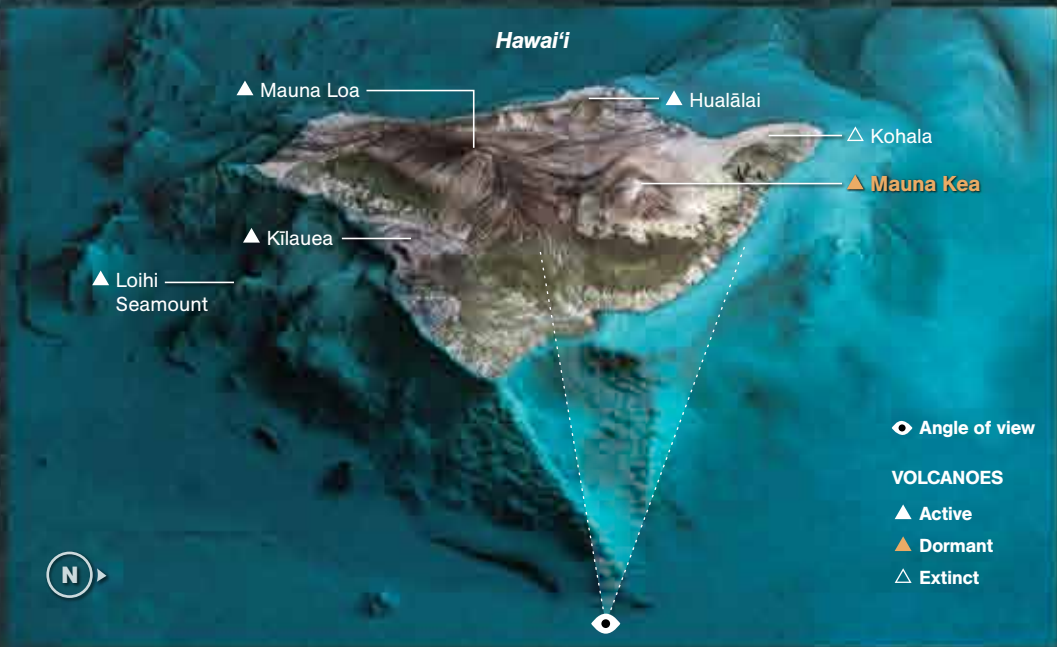
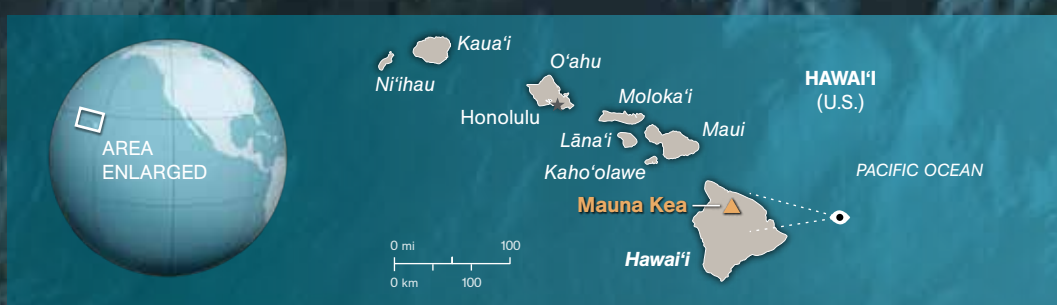
No point on the planet reaches higher into the atmosphere than Mount Everest: 29,035 feet. But as a geologic formation, it is substantially smaller than Mauna Kea. Everest begins its rise in the Himalaya at an average elevation of 19,160 feet above sea level. Its height from base to summit averages 10,000 feet. The base of Mauna Kea starts about 45 miles out from shore at a depth of some 18,900 feet, giving it a total rise of 32,696 feet. Height and mid-ocean remoteness make Mauna Kea the premier astronomical observatory in the Northern Hemisphere, with 13 international telescopes on its summit.

HILO RIDGE

This plunging ridge juts from Mauna Kea's terraces at a depth of 1,300 feet. Research suggests it is part of a ridge built a million years ago by lava from an older, neighboring volcano called Kohala (inset map, below left). Mauna Kea's later lava flows disguised the ridge's origins.

PUNA RIDGE

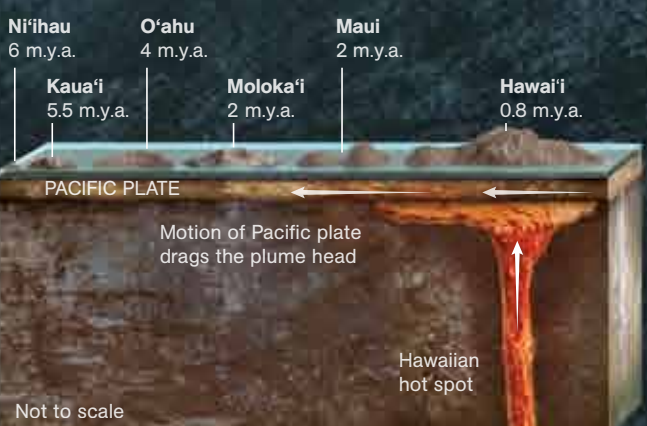
Seen here at the end of its 47-mile-long reach, this ridge was created by a volcano south of Mauna Kea, the still active Kilauea (inset map, left). It's built of rounded "pillow lava," formed when fissures ooze lava underwater. The ridge probably last erupted in the late 1880s.



Volcano Island

Lava from multiple volcanoes built the island of Hawai'i. Mauna Kea last erupted 4,600 years ago but still rumbles. Kohala is extinct. Hualālai last erupted in 1801. Mauna Loa, the world's largest volcano, is slightly shorter than Mauna Kea but more massive. It last erupted in 1984. No other volcano on Earth matches the lava flow of Kilauea, erupting nonstop since 1983. A seamount called Lōhi may surface in 50,000 years.

Minimum age of islands, dated to millions of years ago. Molokai and Maui were once connected.



Engine of an Island Chain

The Hawaiian hot spot, more than 900 miles deep, fuels magma chambers whose eruptions create a volcanic island. As the Pacific tectonic plate moves northwest, about three inches a year, it carries the island off the hot spot. Without fuel, eruptions stop and the island sinks.

Rise and Fall of a Hawaiian Volcano



Undersea origins

Mauna Kea started to form over a million years ago, in stages typical of all Hawaiian volcanoes. Magma rising through fissures in the ocean crust slowly built a volcanic cone of pillow lava and glassy fragments, rock formations created by underwater eruptions.

Breaking the surface

About 800,000 years ago Mauna Kea rose above sea level, and intensive mountain building began. Eruptions became more explosive and effusive. Layer upon layer of lava sculpted a shield volcano, so called for its resemblance to a warrior's shield.

Winding down

Mauna Kea's shieldbuilding phase ended about 130,000 years ago. Cinder cones at the summit mark the location of subsequent eruptions, which buried a larger central caldera. Eruptions flared even when Ice Age glaciers gripped the summit.

Back to the sea

Severed from the hot spot, Mauna Kea and its sister volcanoes will erode and sink due to their sheer weight, which depresses the seafloor. The full legacy of the Hawaiian hot spot is mapped on the other side of this poster: a dogleg chain reaching almost to Russia.

SPECIES RANGE

- Found only on island of Hawai'i
- Found only in the Hawaiian Islands
- Found beyond the islands

LAYERS OF MOUNTAIN LIFE

Birds glide over the flanks of Mauna Kea—and so do whales. Even at the extremes of summit and base, life finds a niche.

13,796 ft
Alpine Stone Desert
Tiny predators like wēkiu bugs, with antifreeze blood, eat insects blown in on the wind.

12,800 ft
Alpine Shrubland
The Hawaiian petrel and the nēnē nest in old lava flows. Like hundreds of the state's native species, they were pushed to the edge of extinction by hunting and by introduced species like livestock and mongooses.

9,500 ft
Subalpine Woodland
Wind patterns usually keep Mauna Kea cloudless above this level, which is still relatively rocky and dry. The pūliā, a bird now found only here, relies on the seeds of the māmane tree, toxic to other birds.

6,600 ft
Montane Forest
Hawaii's only native land mammal, the hoary bat, inhabits this zone, along with the happy-face spider, named for the markings on its abdomen. The Hakalau Forest refuge protects 17 endangered species.

3,000 ft
Lowland
The freshwater stream fish o'opu nopili and coasts birds survive with protection. Most of Mauna Kea's human population lives in this zone. Hilo, population 43,000, is the Big Island's largest city.

0
Sunlight Zone
Where light penetrates, plant plankton thrive, fueling a rich food chain that supports native reef-dwellers like Potter's angelfish and migrating humpback whales.

-1,300 ft
Twilight Realm
Bioluminescent squid hunt here. Pink snapper find shelter in ancient reefs whose living corals died as sea levels rose at the end of the Ice Age.

-3,900 ft
Midnight Zone
Submarine canyons may funnel and concentrate organic detritus that rains down from sunlit waters, helping nourish life in these black depths. The bottom-dwelling monkfish dangles the lures on its head to attract prey. Bamboo coral, adapted to deep water, grows as tall as five feet.

-13,000 ft
Abys
In extreme cold and pressure, ghostly abyssal cusk eels live deeper than any other known fish. A deepwater species of sea cucumber undulates through the water close to the bottom, where it feeds. It luminesces if attacked, then sheds its glowing outer layer and escapes into the blackness.

Base of Mauna Kea

Approximate depth: 18,900 feet below sea level

The main image of Mauna Kea from base to summit is vertically exaggerated by a factor of three. Animals are not drawn to scale. The distance between Hualālai and Mauna Kea is 23 miles.

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