

Star **B** Advertiser

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Local

PLUS

BUSINESS / SPORTS / DAILY BREAK

BUSY WEEKEND AT THE BEACH
Lifeguards make 152 rescues,
issue 13,000 warnings, and there
are two shark sightings >> **B2**

911 REPORT >> **B2**

COMICS & PUZZLES >> **B11-B13**



HIDDEN BELOW THE SURFACE

Puhahonu, which is 99% underwater, tops Mauna Loa as the world's largest shield volcano

On a lonely stretch of ocean in the Northwest Hawaiian Islands sits an unremarkable pair of guano-covered rocky islets that belie the behemoth hidden beneath them.

Below the reef that surrounds Gardner Pinnacles is a shield volcano that University of Hawaii-Manoa scientists have proclaimed the largest in the world.

That determination, announced in a newly published study, means that Mauna Loa is no longer considered the world's largest shield volcano.

In fact, the massive Puhahonu Volcano, at 171 miles long and 56 miles wide, is nearly twice the size of Mauna Loa and is nearly as large as the Big Island itself, which was formed by the work of five volcanoes.

A shield volcano is a wide volcano formed by fast-moving lava flows that build a broad profile over time, resembling a warrior's shield lying on the ground. Many of the largest volcanoes on Earth are shield volcanoes, including all the ones in Hawaii.

A team of volcanologists and ocean explorers from UH Manoa's School of Ocean and Earth Science and Technology surveyed the ocean floor and used modeling to figure out the enormous size of Puhahonu, which in the Hawaiian language means "turtle rising for breath."

Gardner Pinnacles sits some 500 miles from Honolulu in the northwest chain between French Frigate Shoals and Maro Reef.

Rising 170 feet above the ocean, the rocky peaks are the visible remnants of Puhahonu, which eroded over 12 million to 14 million years into what it is today.

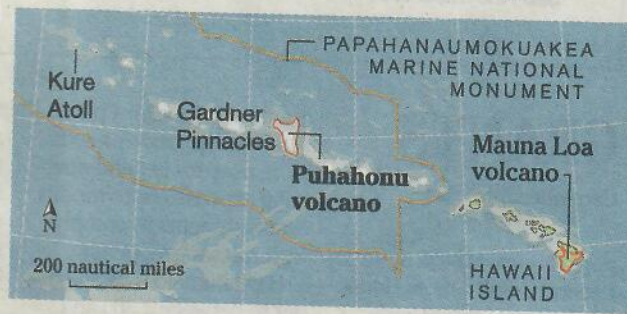
The eroding mass below the waves is so big that it is causing Earth's crust to sink, according to the study, called "Puhahonu Volcano: Earth's Biggest and Hottest Shield Volcano."

A 1974 study using limited survey data described the volcano as the largest in the world. But that study ended up being discounted after further studies concluded that Mauna Loa was bigger, using measurements that included the base of the volcano below the sea-floor and that were not

Please see VOLCANO, B6

WORLD'S LARGEST VOLCANO

Researchers at the University of Hawaii at Manoa have determined that the volcano at Gardner Pinnacles, known in Hawaiian as Puhahonu, is the world's largest shield volcano. The five-year study used updated surveying and modeling methods to figure out that it is nearly twice the size of Mauna Loa, the volcano previously thought to be the largest.



Puhahonu island

1 VOLCANO

- >> 171 miles long
- >> 56 miles wide
- >> Rises about 170 feet above sea level

PUHAHONU



Hawaii island

5 VOLCANOES



Source: UH School of Ocean and Earth Science and Technology

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VOLCANO

Continued from B1

considered in 1974.

Using surveying and modeling methods similar to those used for the latest measurement of Mauna Loa, the new study's authors confirm that Puhahonu is indeed the largest.

Michael Garcia, lead author of the study and retired UH professor of earth sciences, said the rediscovery of the gargantuan volcano occurred during a 2015 ocean voyage to the northwest islands, when the Schmidt Ocean Institute allowed UH researchers to survey the ocean floor of the Papahānaumokuākea Marine National Monument from its research vessel.

Garcia said the size of the obscure volcano was an exciting surprise.

"It just points out that we

still don't know much about the ocean floor even near Hawaii," he said. "We know more about the surface of Mars than what's below the surface of the ocean. The ocean is hiding much still."

Puhahonu is now just a 5-acre island with the smallest land area of any of the Northwestern Hawaiian Islands. But the surrounding reef is the largest in the entire chain at 944 square miles and is home to some of the highest recorded numbers of fish species in the archipelago.

It may be small and isolated, but the island has a surprisingly number of insects and seabirds, though only one species of plant, the succulent sea purslane.

The UH study not only found Puhahonu to be the biggest volcano, but the world's hottest. An analysis of rocks collected from the



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volcano in 1976 and brought to Manoa determined the magma temperature at about 1,700 degrees Celsius, or 3,092 Fahrenheit.

"That's the hottest temperature recorded for lava in

the last 65 million years," he said.

It makes sense, he said, because the hotter the magma, the greater the volume of lava production and the bigger the volcano.

Some volcanologists think hot spots that produce volcano chains like Hawaii end up cooling over 1 million to 2 million years before dying out.

But this study suggests that hot spots can undergo pulses, with a small pulse creating the Midway cluster of now extinct volcanoes followed by another, much bigger one to create Puhahonu, Garcia said.

It proves that Hawaii volcanoes have been erupting some of the hottest magma on Earth for millions of years, he said.

The study was funded by the National Science Foundation, Schmidt Ocean Institute and University of Hawaii.