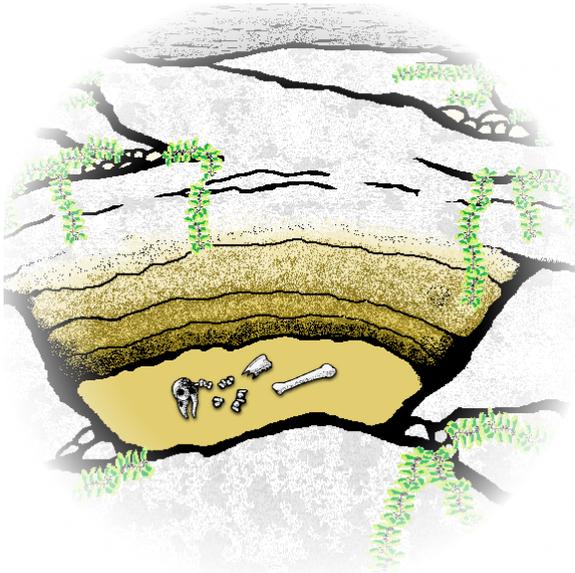


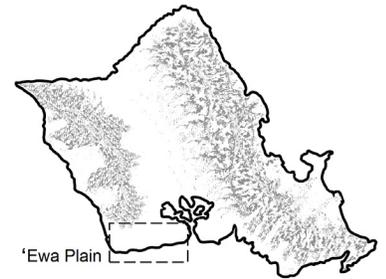
Sensational Sinkholes

Student Reader



Imagine a magical place known only to a few. A place with stories, history and wonder. A place filled with amazing secrets that have been gradually revealing themselves over the years. Keep imagining. Allow yourself to dive beneath the surface of the earth to discover new and unexpected treasures.

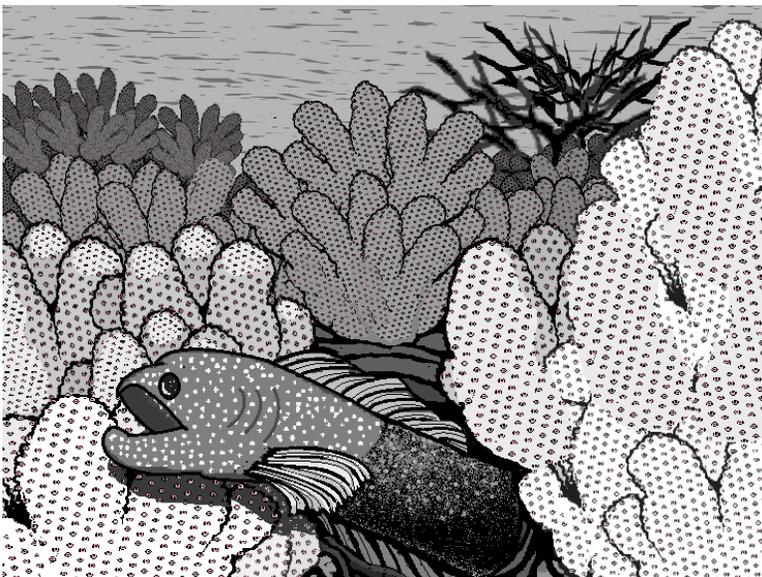
What might you find “beneath the surface of the earth?” SINKHOLES! -- naturally eroded gaps in the earth’s surface where a whole new world exists! Read on to learn more!



There is a land – flat and level – that you may have walked upon, sailed by, driven past or flown over, but perhaps never really paid that much attention to. Created by nature, this is the ‘Ewa Plain of O‘ahu. It’s located in the moku (district) of ‘Ewa and includes well-known places such as Kapolei and Kalaeloa (Barbers Point). It may look as if a busy construction crew spent an enormous amount of time bulldozing the entire land flat, but that’s not at all what happened.

Take yourself back 120,000 years to a time when the ocean was about 25 feet higher than it is today! Back then, this flat land wasn’t even land at all. It was a living, underwater coral reef. Sharks, eels, crabs, seals, and seaweeds populated this rich, shallow sea.

Then time went by. And time brought change. The sea level dropped ever so gradually, exposing the reefs and bringing death to millions of polyps living there in colonies. But since the sea level change took thousands of years, the larger creatures were able to move to safer areas. The ocean continued to provide them everything they needed: habitat, food, health, and protection. Over time, the sea where they used to live simply disappeared.



With the dead coral reef above sea level, it became land. (Check out the sample accompanying this reader.) Then another gradual process began. Rain falling on the mountains of Wai‘anae and Ko‘olau brought dirt down to the old dead reef, filling in gaps and covering it. This created a broad, flat area known as the ‘Ewa Plain. Here, seed by seed, a dryland forest began to form. In place of eels and seals, sea birds, forest birds, and even tiny tree snails made this habitat their new home.

Changes continued. The dead coral reef – so obvious in some spots today – was affected by rainfall. Rainwater containing small amounts of acid began dripping slowly and steadily through the dead reef. This decayed the calcium in the reef, forming large holes. Some are several feet across! Some are 10 feet deep! And some

expanded into bell-shaped underground caverns!

Why bell-shaped? Rainwater that collects beneath the surface evaporates slowly. Where it ponds, the acidic water keeps eating away at the lower walls of the sinkholes, making them much wider at the bottom than they are at the top. This continues until the holes become about 10 feet deep, where they come in contact with underground fresh water stored in rock. When acid rainwater combines with underground fresh water, it becomes diluted and stops eating away at the old coral reef. This is how sinkholes form in Hawai'i over thousands of years.

Now, let's go back to the surface. Imagine an animal scampering along the plain looking for its next meal, when suddenly it tumbles down into one of the many deep sinkholes. Running around with no possibility of escape, how could it survive? It simply couldn't. And hundreds of years later, long after its body had decomposed, its bones remain to tell the story of how this creature had become trapped, then slowly starved and sadly passed away.

Today, bones of birds, shells of tree snails, and remains of lizards, dogs and rats tell their own stories to help paint a picture of early life on the 'Ewa Plain. Some burned bird bones found in sinkholes serve as clues to suggest that early Hawaiians used this lowland forest as a hunting ground where they cooked and ate. This area must have also been useful for people collecting other valuable resources.

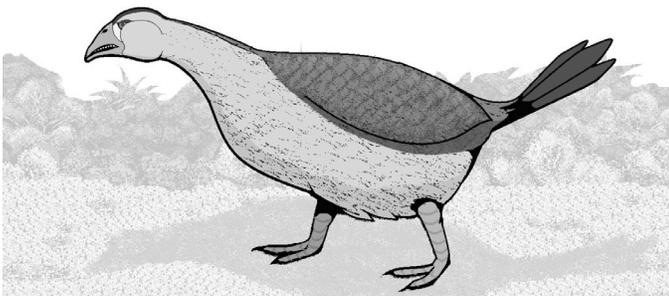


As you may already know, Hawai'i has always been a special place. From goddesses and gods, from volcanoes to rainforests, and from seagoing wayfarers to chiefs and chiefesses, these islands offer much for explorers young and old. So, continue investigating your island home, and Hawai'i will become more fascinating every day. For proof, read on!

Few of the original tens of thousands of sinkholes of O'ahu exist today. Development and agriculture have destroyed 99 percent of them. From the very few left, scientists made some wonderful discoveries. Remember the 'Ewa dryland forest? Evidence from the sinkholes tells us that this forest was populated by birds such as 'elepaio as well as eagles, crows, hawks, owls, and more. Some were absolutely astounding!



Birds developed in ancient Hawai'i where predators such as cats and rats were absent. Many of these birds were larger than their flighted cousins but couldn't fly themselves. Scrambling about on the 'Ewa Plain were geese 3 feet tall, an unusual moorhen the size of a chicken and a good-sized rail! The largest herbivore was the Common Oahu Moa Nalo, seen on the right. It was bottom-heavy and had a massive beak with unusual bony "teeth" adapted for stripping, tearing, and chewing plants. What a world! And these examples are only from lowland O'ahu habitats! Found only in Hawai'i, many unique flightless species faded into history until someone stumbled across a few hidden clues and – lucky for us – began investigating.



exploring what Hawai'i has to offer. With a little imagination, you can make the past spring to life! But be careful. As you're springing around, don't fall into a sinkhole – no matter what may be awaiting your discovery!

Who knows what else is out there waiting to be discovered? Keep your thinking caps on. Continue