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University of Waterloo professor Alan Morgan wants kids and adults to know more about the geological history of their world. He's hoping the GeoTime Trail will do just that.

# A walk through time

## GeoTime Trail allows hikers to learn more about the geological history of their world

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RECORD STAFF

On a sunlit trail in west Waterloo, the history of the Earth is unfolding.

Hikers will become time travellers on a unique pathway called the GeoTime Trail.

The GeoTime Trail is the brainchild of Alan Morgan, a University of Waterloo earth and environmental sciences professor who wants kids and adults to know more about the geological history of their world.

The school system gives students little instruction in earth sciences, Morgan says.

Yet the subject touches us every day as we plot where to build our houses; drive our fuel-burning cars, and respond to natural disasters around the world.

"I'm afraid the public really doesn't understand the processes that go along with earthquakes or tsunamis or landslides or flooding... or anything else that the planet throws at us," Morgan says.

So the earth scientist is working with the City of Waterloo to create a special trail on the West Side Trail system that takes you back in time.

Morgan wants us to understand the "immensity of

geological time."

Every metre of the GeoTime Trail represents one million years of geological time. Each millimetre represents 1,000 years.

By trail's end, hikers will have walked 4.567 kilometres — a length equivalent to the age of the Earth at 4.567 billion years.

Along the way, Morgan's illustrated signs will describe the geological period represented by the distance that hikers have walked.

He'll tell hikers what was happening in the world at that time; even what was happening in Waterloo Region.

"In some cases this area was under ocean water. In other cases it was on the top of mountains," Morgan says.

"We can tell what was happening in this area by the rocks that have been laid down."

The trail illustrates just how little time humans have spent on Earth.

"It is sobering to realize that after walking 4.5 kilometres, pretty well all of human history is represented in five millimetres of the trail," Morgan says.

"Of course, hu-

### OPENING DAY

**The City of Waterloo is opening the trail, and unveiling a sundial to mark the city's 150th anniversary and 150 kilometres of trails and bikeways.**

■ **When?:** Sun., Oct. 21 at 1 p.m. Guided walking tour from 1:30 p.m. to 3 p.m. Wear comfortable shoes.

■ **Where?:** Lookout Park (872 Munich Circle, Waterloo).

manity goes back further than that, but in reality most of our written records... go back 5,000 years.

"We know that there were urbanized settlements that went back 10,000 years but that would only occupy that last centimetre so it doesn't make a great deal of difference.

"It really is a hairsbreadth in terms of the size of geological time."

The GeoTime Trail is the first of its type in Canada. It's also one of the first projects in the country to acknowledge the International Year of Planet Earth in 2008.

So far, only 1.3 kilometres of the trail is marked with 10 signs, representing 1.3 billion years ago to the present.

The 4.5-kilometre loop will be completed over the next few years as the Vista Hills development takes place on the far side of the forested hills.

On Sunday, the City of Waterloo will officially open the first part of the GeoTime Trail at a spot off Munich Circle.

Morgan, who volunteers his ideas, expertise and time, will lead a walking tour. The Canadian Geological Foundation also contributed to the project.

"This is something we believe other communities will use," said Karen Moyer, Waterloo's special projects manager who is working on the GeoTime Trail with project manager Geri Quin.

A future website will help teachers and students use the trail.

Here are some of the facts the GeoTime Trail will teach you:

■ **1.3 billion years ago. Late Precambrian:** When the Precambrian rocks were being formed, "there were volcanoes active in the Waterloo Region and the area was located in the southern hemisphere," Mor-

### PERIODS IN TIME

**Every one millimetre of the GeoTime Trail represents 1,000 years.**

- At 24 mm: Glacial ice advanced across Waterloo Region.
- 15 mm: The Waterloo Moraine appeared above the ice surface.
- 14 mm: The Great Lakes formed about 14,000 years ago.
- 13 mm: Mammoths lived in Waterloo Region.
- 12 mm: Boreal trees grew in the area.
- 11 mm: Glacial Lake Algonquin flooded the Huron Basin.
- 10 mm: Humans hunted caribou, mammoths and mastodons.

gan's sign says.

The Canadian Shield was being formed as a result of a continental collision which created a "supercontinent" called Rodinia.

■ **950 million years ago. Late Precambrian:** There was a giant mountain range where Waterloo Region now exists that stretched to the Labrador coast.

The low mountains extending from the Algonquin Park region through the Ottawa area to Quebec City are the eroded remnants.

Rodinia started to break apart 200 million years later, forming the cores of many modern continents including North America.

■ **600 million years ago. Late Precambrian:** Advanced life forms, probably the ancestral forms of sponges, jellyfish and lobsters, appeared in the world's oceans. Those "Ediacarans" are found preserved as fossils on every continent except Antarctica.

■ **505 million years ago. Paleozoic:** Advanced life forms exploded in the Cambrian Period. In Waterloo Region, Cambrian rocks are represented by two metres of beds about 853 metres

below us. Abundant and diverse fauna appeared in the oceans.

"In Waterloo Region, we've gone through a period of mountain building; we've gone through a period of mountain erosion; we've gone through a period where a supercontinent has broken up in the same way that Africa is breaking up at this point in time," Morgan said.

"After the supercontinent broke up, the region that we're in actually became submerged and we became part of a marine basin and this was a start of an ocean known as Iapetus." That ocean remained for 200 million years.

■ **420 million years ago. Paleozoic:** In the Silurian Period, the tropical seas of Waterloo Region were filled with corals, brachiopods, trilobites, fish and marine scorpionlike animals.

By Late Silurian time, shallow oceans in this part of North America had dried up and minerals such as salt were deposited in salt pans. There are salt deposits underneath the Grand River Basin.

The signs go on to describe other periods in Earth's history. Morgan knows that kids es-

pecially will be interested in the Middle Jurassic Period, 150 million years ago, when dinosaurs roamed the land and marine reptiles swam in the oceans.

"We either had the big dinosaurs wandering around in this region," or we had marine reptiles such as ichthyosaurs, Morgan says.

"It really depends on whether Waterloo Region was underwater at that point in time or on land and I have a sneaky feeling it was probably underwater."

At the end of the Cretaceous Period, 65 million years ago, the dinosaurs vanished. That happened after an asteroid impact in Yucatan, Mexico, "that left a layer of iridium in many parts of the world."

The event set the stage for today's world, Morgan says.

Morgan, whose Waterloo home is filled with shells, fossils and other reminders of Earth's history, hopes the trail will help put us in our place on Earth.

Maybe then, we'll show more respect.

"Petroleum deposits in Alberta were created at a time when the dinosaurs were around and we use these natural resources as if they were created especially for us," he says.

Morgan is worried about humans' uncertain future — when the Arctic Ocean is ice-free, when we're pounded by more strange and unpredictable weather, when our water supplies are depleted.

"What we're doing to the planet, the planet will rectify," Morgan says. "But the real problem is humanity and what we're going to do to ourselves." [baggerholm@therecord.com](mailto:baggerholm@therecord.com)

