

Auckland's Volcanic Field

What is a volcano?

A volcano is simply a point where molten rock from deep within the earth has reached the surface.

How many volcanoes does Auckland have?

The Auckland volcanic field has about 50 volcanoes, within an area of 360 square kilometres. Some take the familiar shape of hills with large craters at the top, like Rangitoto and One Tree Hill. Some have been quarried away, like Albert Park or Mount Smart, and some have always just been large holes in the ground, like Panmure Basin or Orakei Basin.

How were they made?

New Zealand sits where two slowly moving plates of the earth's surface meet. Where one plate slips over the other, cracks can form and molten rock, or magma, from about 100 km below rises to the surface. The volcanoes of the central North Island and White Island were formed in this way. The Auckland volcanoes however, are probably the result of a "hot spot" - a concentration of magma where one of the earth's plates is under tension.

Every now and then, a bubble of magma pinches off from the "hot spot" and rises up through solid rock, like a bubble leaving the bottom of a pan of hot water. Near the surface, pressure from the rocks above lessens, and gases within the magma are released. The bubble may also reach ground or surface water, creating enormous amounts of steam. The sudden pressure from these gases causes a huge explosion, creating a new Auckland volcano. If the magma bubble is a small one, that may be the end of the process, and only a crater remains, surrounded by a ring of ejected material. Panmure Basin is a good example of this type of structure, known as a maar.

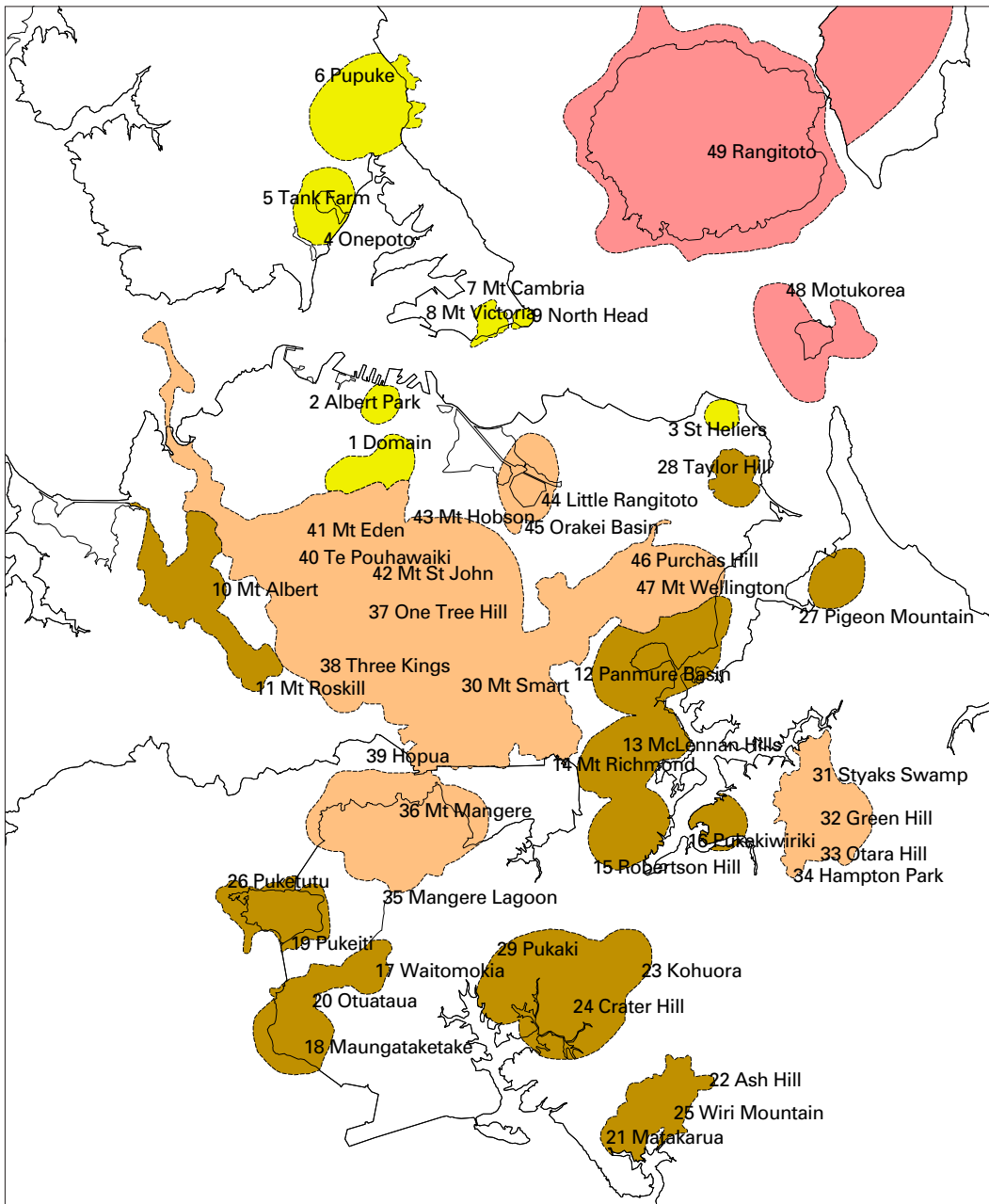
Larger bubbles may go on to send liquid rock to the surface for years, building up rocky scoria cones like One Tree Hill. They may even produce long lava flows. About 75 square kilometres of the Auckland area is covered by such flows (refer Hazardfacts H02 - How do Auckland Volcanoes Form?).

How old are they?

It is thought that Auckland's volcanoes first began to appear between 60 000 and 140 000 years ago, starting with the eruptions of Albert Park and the Domain. The largest and most recent eruption was Rangitoto, about 600 years ago, which would have been witnessed by local Maori. The field is expected to have a total life of approximately a million years, so geologically speaking, it is still very young.

Could any of Auckland's volcanoes erupt again?

Even though the larger volcanoes like One Tree Hill and Rangitoto may have been created by successive eruptions over a period of centuries, it is unlikely that any of Auckland's existing volcanoes will become active again. However, bubbles could pinch off from the hot spot beneath Auckland and create new volcanoes at any time. To gather information on the field, and help provide advance warning of any volcanic activity, the Auckland Regional Council monitors seismic activity in the Auckland area (refer Hazardfacts H05 - Auckland Volcano-Seismic Monitoring Network).



Te Kaunihera o
MANUKAU
City Council



NORTH SHORE CITY



Waitakere City Council
Te Taiao o Waitakere



AUCKLAND CITY



Franklin
DISTRICT COUNCIL



Rodney
DISTRICT

References and further reading

Cox, G.J. (1989) *Fountains of Fire: The Story of Auckland's Volcanoes*. William Collins Publishers Ltd, Auckland.

Johnston, D.M., Nairn, I.A., Thordarson, T., Daly, M. (1997) *Volcanic Impact Assessment for the Auckland Volcanic Field*. Auckland Regional Council Technical Publication No. 79, April 1997.

Kermode, L. (1992) *Geology of the Auckland Urban Area*. Institute of Geological and Nuclear Sciences Ltd, Lower Hutt.

Smith, I.E.M. & Allen, S.R. (1993) *Volcanic Hazards at the Auckland Volcanic Field*. Civil Defence Volcanic Hazards Information Series, No. 5, CD 304.

Hazardfacts in the volcano series: H02 (How do Auckland Volcanoes Form?), H03 (Rangitoto: Auckland's Youngest Volcano), H04 (Auckland's Volcanic Hazards), H05 (Auckland Volcano-Seismic Monitoring Network), H10 (Volcanic Eruption in Auckland)

<http://www.arc.govt.nz/volcanic>



Auckland
Regional Council
TE RAUHITANGA TAIAO