

Gnangara groundwater packs acidic punch

July 19 2013

HYDROGEOLOGISTS have detected elevated acidity levels in the Gnangara Mound water table, north of Perth.

UWA Associate Professor Ryan Vogwill, who co-supervised the research, says the local Bassendean sand consists almost entirely of quartz, making it particularly susceptible to acidification as the <u>water</u> <u>table</u> falls.

Lead author Steve Clohessy says <u>water samples</u> showed pyrite oxidation near the water table.

"In 2007-2008 mainly we installed <u>groundwater</u> monitoring bores screened near the water table," he says.

"We then did some groundwater quality sampling between 2008 and 2012.

"The mechanisms of pyrite oxidation in acidifying groundwater in <u>sediment</u> near the water table are there throughout our investigation in the Bassendean sands.

"Pyrite oxidation was indicated by low pHs, generally less than five down to 3.13 at one location, high sulphate to chloride ratios (mg/L) to higher than point five, and elevated levels of aluminium and iron.

"Sulphate to chloride ratios greater than point five is indicative of an additional source of sulphate which can also be from fertiliser leachate



or seawater intrusion.

"However in our area of study this is not likely.

Mr Clohessy says they are confident that the acidity and sulphate is from sulphide oxidation – so <u>oxidation processes</u> through groundwater pumping or water table level decline, which in turn oxidises these naturally-occurring iron sulphide sediments and producing sulphuric acid.

"This is an efficient acid-generating process in a very poorly buffered environment," he says.

"Relatively small amounts of acidity in conjunction with negligible levels of alkalinity in this poorly buffered environment have been shown to cause significant pH decline.

"The aim of the study was to characterise the quality of ground water near the water table, mainly in Bassendean sand.

Mr Clohessy says the Department of Water conducted a Perth <u>shallow</u> <u>groundwater</u> systems investigation that published detailed hydro geological reports on some wetlands on the Swan coastal plain, that were also located in their study area.

"Getting an understanding of the water quality near the water table rather than a bit deeper was our focus with a lot of the geochemical interactions being exacerbated by water table fluctuation," he says.

"It's to do with how it might affect groundwater dependent ecosystems, wetlands and vegetation.

"Also, people with groundwater bores in their backyard would generally



be tapping in to the top layers of the superficial aquifer.

"If you have a good understanding of the quality of groundwater near the water table, initiating management strategies sooner will give a better chance of effectively protecting these ecological values."

Provided by Science Network WA

Citation: Gnangara groundwater packs acidic punch (2013, July 19) retrieved 1 May 2024 from <u>https://phys.org/news/2013-07-gnangara-groundwater-acidic.html</u>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.