Kathleen Johnson 3MT Transcript | University of Guelph Campus Final 2020

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Title: Understanding Groundwater in the City of Guelph

Transcript: Twenty years ago, in a small town in Ontario called Walkerton, 7 people died and over 2000 people got sick when bacteria entered a groundwater well that supplied water to people's homes. This event was a wake-up call for Ontario about the importance of understanding and protecting our drinking water. One of the many new regulations that came out of this tragedy, now requires Ontario communities to develop computer models of their drinking water sources to better prevent and predict contamination threats. But these models are only useful if they accurately represent reality. So how do we make that happen?

My research looks at one drinking water well here in the City of Guelph. Guelph is one of largest cities in Canada to rely solely on groundwater for our drinking water. Our tap water is pumped out of 21 groundwater wells, treated to current Ontario drinking water standards and provided to over 130 000 people's homes, and industries and institutions, like schools and food processing plants. As required by the new regulations, the Guelph area developed a computer model to better understand how potential contamination sources, such chemicals, road salt or bacteria, may, or may not, reach our drinking water. In general, groundwater that flows through fractured rock, like here in Guelph, can move much faster through cracks in the rocks than between pieces of soil because there is more space. However, we are very lucky that in many groundwater systems, we have protective layers of rock, that allow the water to flow a little bit slower, and can therefore prevent contamination from reaching the groundwater that we drink. It is very important that we represent this protective rock layer accurately in the computer models. In order to do that, we need to collect field data

We drilled 5 smaller wells, called "sentry wells", around one drinking water well here in Guelph. By installing pressure sensors at different depths in the wells, we can get an understanding about how the groundwater is flowing through the protective rock layer, which can change depending on pumping of other wells in the area, by how much it is raining and even by how much the air

pressure is changing. There are two key benefits to this research. The first is that my analysis will allow a better understanding of the groundwater flow to be incorporated into the computer model which will help improve decision making to protect Guelph's drinking water. The second is that the City of Guelph can continue to sample these "sentry" monitoring wells

into the future and use them as real-life bodyguards to inform them if contamination threats are heading toward the drinking water well.

We are very lucky here in Canada to have lots of water but if we want to protect it for our children and our grandchildren, we need a strong understanding about how it moves. Thank you.

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