

Aberfoyle Summary

2017

Nestlé Waters Canada
Aberfoyle Site



Aberfoyle Overview

Nestlé Waters Canada has been a proud community partner, environmental steward, and employer in Wellington County for the last 18 years. Water supply sustainability is as critical to Nestlé as it is to the community.

Nestlé bottles water at the Aberfoyle facility in Puslinch, near the City of Guelph, in Southern Ontario. Nestlé purchased the property in December 2000 and bottles water from well TW3-80 (see Figure 1 for the well location). The water taking is governed by a Permit to Take Water (PTTW) issued by the Ontario Ministry of the Environment and Climate Change (MOECC), which allows Nestlé to withdraw up to 2,500 L/min for a total of 3,600,000 L/d. The current permit expired on July 31, 2016.

Nestlé submitted a permit renewal application for well TW3-80 to the MOECC in April 2016. The application seeks the same withdrawal limits as the current permit. In accordance with the Ontario Water Resources Act, Section 34.1 (6), Nestlé continues to legally operate under the existing permit until a decision is made regarding the renewal of the permit.



Figure 1. Nestlé Aberfoyle Property in Puslinch



Nestlé has conducted extensive testing and studies over the years to ensure that their operations do not diminish the availability of water for other users or the environment. Studies include:

- Five pumping tests to evaluate aquifer properties and predict effects of water withdrawals;
- Geophysical logging of wells to understand the bedrock geology;
- Near-continuous measurement of groundwater and surface water levels;
- Stream flow measurements in Aberfoyle Creek;
- Water quality sampling in the overburden and bedrock aquifers; and
- Ecological surveys of the wetlands and creeks.

Permit conditions require Nestlé to monitor the natural and pumping-related variations in groundwater and surface water levels, including at private wells belonging to local businesses and residences. Nestlé additionally evaluates wetland vegetation, species diversity, stream flow, and stream temperature to ensure that the groundwater withdrawal does not affect the habitat of water-dependent ecology.

Nestlé is dedicated to managing the water source for long-term sustainability because their business depends on it and because it is the right thing to do. There have been no adverse impacts on the aquifer or ecosystems resulting from 17 years of Nestlé's Aberfoyle operations.

2017 Annual Monitoring Report

Supply Well TW3-80

An aquifer is a highly permeable rock or sand formation that stores and transmits significant quantities of water. An aquitard is an impermeable rock or clay formation that impedes the movement of groundwater.

In the Aberfoyle area, groundwater for water supplies is typically derived from two bedrock aquifers, separated by an aquitard. The Upper Bedrock Aquifer (Guelph Formation and Reformatory Quarry Member of the Eramosa Formation) consists of the shallowest bedrock and supplies water to numerous residences. Nestlé's well TW3-80 withdraws water from a deeper aquifer, the Lower Bedrock Aquifer (Goat Island and Gasport Formations). A steel casing lines most of well TW3-80, such that water only enters the well from the Lower Bedrock Aquifer, between 28.4 and 31.1 metres below ground. The Upper Bedrock and Lower Bedrock Aquifers are separated by the Intermediate Bedrock Aquitard (Vinemount Member of the Eramosa Formation), which resists the flow of water between the two aquifers.

TW3-80 Permit

Nestlé is permitted to take water from TW3-80 at a rate of up to 2,500 L/min, or a maximum of 3,600,000 L/day. Nestlé does not withdraw this full amount of water since water is only withdrawn when it is needed for bottling and plant operations. In 2017, Nestlé withdrew 58% of the permitted volume for the year. The most water Nestlé withdrew in a single day in 2017 was 84% of the permitted daily limit. The annual volumes of water taken from 2001 to 2017 are shown on Figure 2. The volume of water withdrawn from TW3-80 in 2017 was approximately 2% lower than the total reported for 2016. On an annual basis, the

volume of water withdrawn from TW3-80 in 2017 has been similar to the water withdrawn in 2015 and 2016.

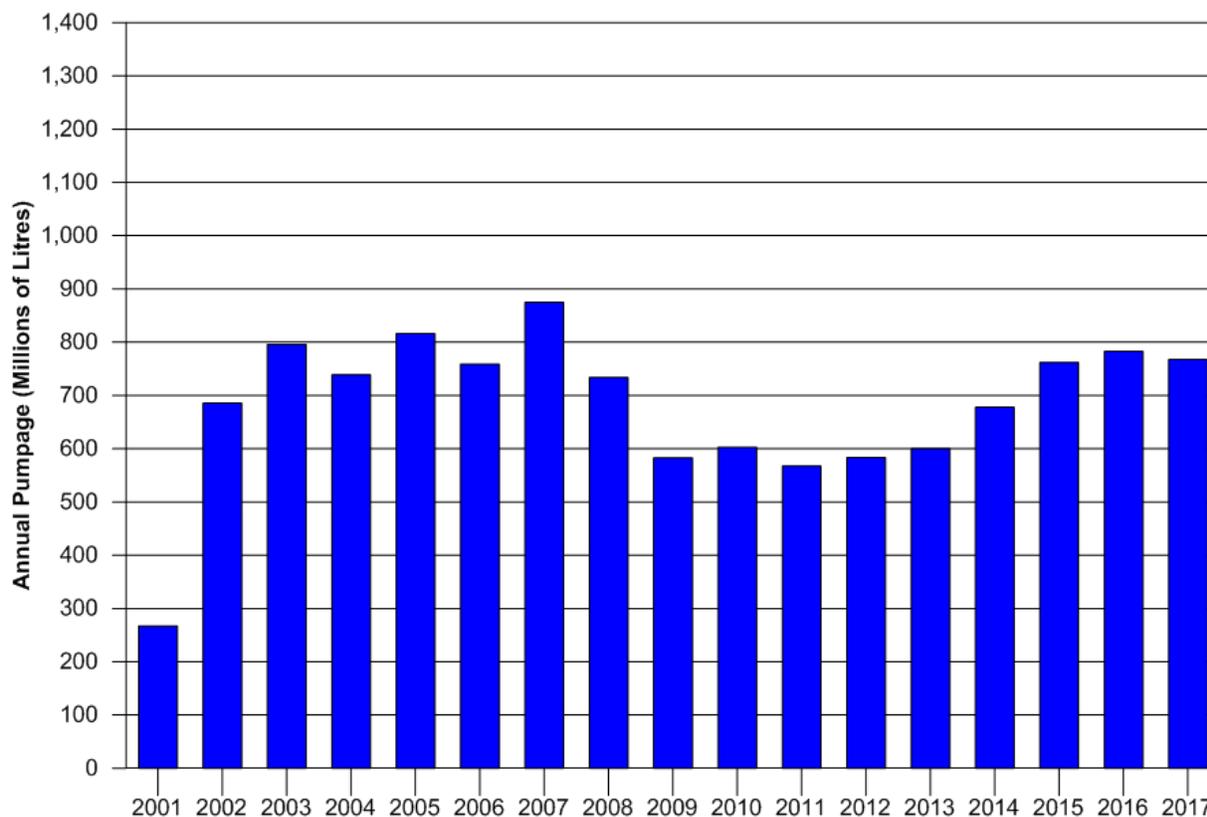


Figure 2. TW3-80 Annual Water Takings

Monitoring Overview

Site Monitoring

Independent scientists are contracted by Nestlé to monitor the groundwater system, surface water features, wetlands, and natural environment at the Aberfoyle facility. Water extraction rates from TW3-80 are recorded by Nestlé and reported to the MOECC. Monitoring efforts ensure that Nestlé’s operations do not adversely affect the groundwater, surface water and natural environments.

The groundwater and surface water monitoring program consists of monitoring at 82 points within 2 km of TW3-80 each month as follows:

- TW3-80 and an unused production well (TW2-11);
- 16 monitoring well nests of between one and five wells each (a total of 38 wells) that are completed at various levels in deep bedrock, shallow bedrock and the overburden;
- 7 surface water stations to measure stream levels;
- 9 mini-piezometer nests (a total of 18 piezometers) to measure shallow groundwater levels;
- 6 temperature stations to measure changes in stream temperature; and

- 11 private wells.

The ecological monitoring consists of:

- Fish and fish habitat monitoring;
- Water temperature monitoring;
- Vegetation monitoring; and
- Wildlife monitoring.

Monitoring Results

The water taking from TW3-80 has been similar over the past three years (2015 – 2017); the pumping and non-pumping water levels have also been similar over this period. Ongoing pumping from TW3-80 has not led to a long-term decline in water levels in the well.

Groundwater monitoring documents that water levels in the Lower Bedrock Aquifer are influenced by pumping of TW3-80 over the short-term and long-term and by recharge (as reflected by trends of total precipitation) over the long-term. The short-term pumping effects are evident with the water levels fluctuating in response to daily changes in pumping rates. The long-term pumping effects are observed more in the wells closer to TW3-80 where water level changes from year to year correlate with overall annual water taking (i.e. increased water taking result in lower water levels). There is also evidence that the water levels correlate with precipitation trends (i.e. lower water levels correlate with below average precipitation while higher water levels correlate with above average precipitation).

Figure 3 illustrates groundwater conditions on Nestlé's property. Monthly average water levels (bottom graph) are shown for the Lower Bedrock Aquifer (blue), Upper Bedrock Aquifer (red) and overburden (green). Monthly pumping volumes (black line in bottom graph) and monthly precipitation (top graph) are also shown. The water levels are generally lowest each year during the summer months, when Nestlé's pumping approaches 60 to 80 million L/month. The data shows that water levels in the Lower Bedrock Aquifer are influenced more than water levels in the Upper Bedrock Aquifer and overburden from pumping TW3-80.

The long-term effects of recharge (as reflected by trends in total precipitation) are also evident in the water level data. For example, the lower water levels in 2012 correlate with a time of below average precipitation at a time when pumping from TW3-80 was lower. These trends are seen in aquifers across Ontario as wells responded to drier periods of lower precipitation. This was also observed in the summers of 2015 and 2016.

Water levels in the Lower Bedrock Aquifer in 2017 are within the range of water levels observed in the past. Overall, the trend of water level variation in the production aquifer is stable and the groundwater taking from TW3-80 has not caused a long-term declining trend in the aquifer water level. Water levels measured in the Upper Bedrock Aquifer and overburden are also similar to water levels measured in the past, with no overall increasing or decreasing trend.

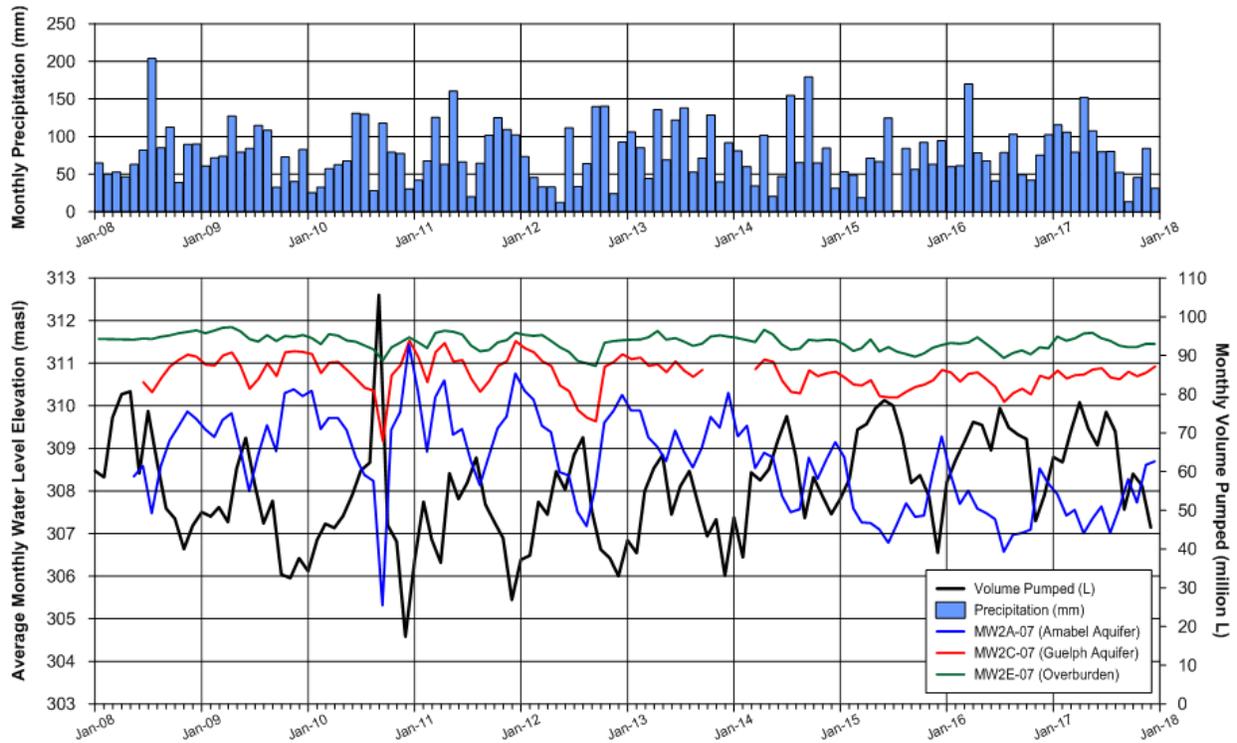


Figure 3. Hydrograph of Monitoring Wells 150 m North-Northwest of TW3-80

Summary

Nestlé takes its environmental stewardship responsibilities seriously and is committed to sustainable management of natural resources. Nestlé is committed to being accessible and answering questions throughout the permit renewal process. Nestlé's Aberfoyle water withdrawal activity has not resulted in adverse impacts to groundwater, surface water, wetlands, or other natural resources.