Going Under Ground
Geology of "The Rock"

Vashon-Maury Island's nickname, "The Rock," is somewhat of a misnomer. The Island is essentially the refuse left by the comings and goings of glaciers. It is a pile of cobbles, gravel, sand, silt and clay; a scattering of boulders with a bit of organic matter thrown in.

Map Orientation, Diving inside "The Rock"

The map below shows the surface geology of our Island. The different colors represent different geologic layers. You can see how the layers stack up by looking at the cross section view. It represents what we might see if someone took a chain-saw and cut through part of the Island. Take a look at the key to help you understand the Island's innards and how geology affects water.

Water from sand

About 80 percent of our drinking water comes from a sand and gravel formation often referred to as the "primary aquifer." It's identified on geologic maps as the "Qva" unit.The ease by which water moves through these sand and gravels is highly variable and depends upon the size of the particles.

Water moves

Water can move through glacial sands and gravels 10–100,000 times faster than it can through silts and clays deposited in non-glacial periods.

Till: Our dense overcoat

Much of the Island is covered by a protective overcoat called glacial till. It's material that is laid down in front of a glacier and then is overridden and compacted by the glacier. It's also called "hardpan" and invariably frustrates local gardeners when they try to dig.

What's an aquifer?

Geologic formations which hold and let water move easily are called "aquifers." A mixture of sand and gravel makes a good aquifer. The amount and rate at which you can withdraw water depends on the specific characteristics of the aquifer at the well site.

What's an aquitard?

Geologic layers that impede the movement of water are called "aquitards." Silt and clay, which are made up of small particles, are aquitards because water has a hard time squeezing between the tiny particles.

Gravel, sand, silt and clay

Below the primary aquifer are clay and silt formations. Although clay does a great job of holding water, it won't give it up easily and forms a barrier that slows the downward progress of water. Some water does eventually make its way through clay to other sand and gravel formations often called "deep aquifers."

LEGEND

Cross Section Line

Geologic Layers In Map

- **Predominantly sands and gravels deposited by streams as a glacier recedes or subsequent flowing waters** - these units are *aquifers* and when exposed on the surface of the Island are particularly at risk of contamination (Geologic name - Qvr)
- **Glacial Till** - a mixture of cobbles, sand, gravel, silt and clay compacted by the weight of the glacier, often referred to as "hardpan." It impedes the infiltration of water and is an *aquitard*. (Qvt, Qpdt, Qpogt)
- **Predominantly sand and gravels deposited by streams -** these units are considered *aquifers*, but are not always saturated with water. (Qva, Qpdc, Qwbc, Qdbc)
- **Interbedded layers of sand and gravel and silt and clay** - deposited during non-glacial periods in streams/floodplains. This unit offers both *aquifer* and *aquitard* pockets. (Qob, Qpf, Qpdf)
- **Predominantly silt and clay deposited in lakes or marine environments** - clay impedes water infiltration. These units are *aquitards*. (Qpff, Qpdf, Qds, Qdbf, Qpof)
- Other Geologic Units (Qw, Qoal, Qf, af)

This simplified geologic map and cross section was adapted from Geologic Map of the Vashon 7.5' Quadrangle and Selected Areas, King County, Washington by Booth and Troost; 2007. The cross-section shown is from this report.

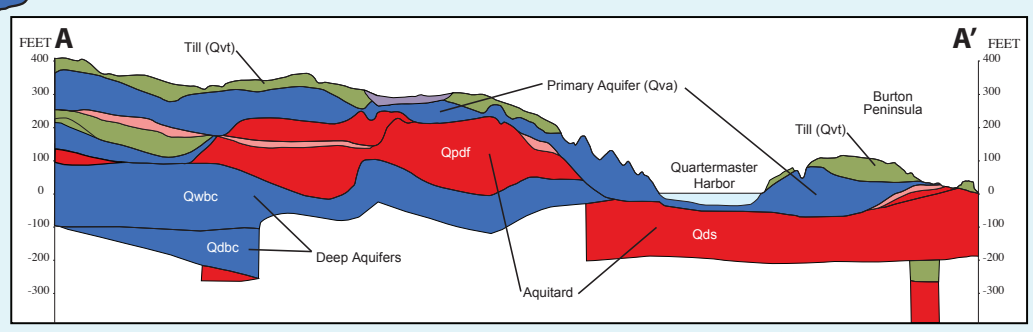
Deep aquifers

Less is known about these aquifers because fewer deep wells have been drilled on the Island. Notice on the cross section that the Qwbc layer, for example, extends from about 100 feet above sea level to 100 feet below sea level. Some wells extend to over 300 feet below sea level.

photos (2) by Charles Backus

Unsaturated sands and gravels of the primary aquifer (Qva) on Maury Island.

Springs emerge where groundwater moves laterally along the interface between the sand and clay layers and squirts out the side of the Island and inland ravines.



A slice of geologic cake

Above, you will find a cross section of the Island. It's like taking a look at a slice of layer cake. A-A' depicts a slice of Vashon from mid-Island to the tip of the Burton Peninsula. Notice how the thicknesses of the different layers change and how some layers are discontinuous.

HOT LINKS

Want to know more?

To learn more about the Island's geologic characteristics, see Chapter 4 of the ***Vashon-Maury Island Rapid Rural Reconnaissance Report*** and check out the geologic map created by **Derek Booth and Kathy Troost**.