

How Does Groundwater Affect the Phosphorous and Nitrate Levels in Lake Carmi?

When: Summer - Fall 2020 (Covid-19 permitting)

Objective: To use a multi-part, field-based study to determine whether groundwater influences phosphorous and nitrate levels in Lake Carmi and the streams feeding it. The parts are described below. This study is part of the State of Vermont's efforts to improve water quality in Lake Carmi.

Bedrock Geologic Mapping



Why: Layers and cracks in the bedrock formations can be pathways for groundwater and contaminants (phosphorous and nitrate) to travel to Lake Carmi.

How: A geologist needs to examine as many rock outcrops as possible in the Lake Carmi Watershed (~10 miles²) and determine rock type with a hammer and hand lens and take compass measurements at each.

Helping Us Out: We need permission to go on private land. Please help us with land access.

Surficial Geologic Mapping



Why: The porosity and permeability of soil/surficial deposits determine how readily rainfall and surface water containing contaminants (phosphorous and nitrate) percolate downward to the water table.

How: A geologist needs to examine as many shovel pits or auger holes as possible in the Lake Carmi Watershed (~10 miles²) to determine deposit type (gravel, sand, silt, clay) and layering. All holes are filled in promptly.

Helping Us Out: We need permission to go on private land. Please help us with land access.

Groundwater+Surface Water Sampling



Why: Ground- and surface water samples are taken from wells and streams all over the Lake Carmi Watershed to look for chemical trends that may reveal the source area(s). In addition to phosphorous and nitrate, herbicides and many other chemical parameters are also tested for.

Well Sampling



How: Groundwater from wells or springs is sampled using a hose from an outdoor faucet (no filtration in place) or directly from the pressure tank in the basement (before filtration). Sampling takes ~30 minutes. Herbicide sample is being taken in right photo.

Helping Us Out: We are seeking volunteers to have their wells sampled (no cost).



Stream Sampling

How: Surface water is sampled directly from a stream or lake.

Shallow Monitoring Wells



Why: To sample water levels and the chemistry of shallow groundwater in soil.

How: Shallow monitoring wells made of PVC tube and a screen are installed with a small drill rig (Geoprobe) at multiple locations around Lake Carmi.

Helping Us Out: We still need a few volunteers to allow us to install wells on their property (contact Grahame Bradley at Grahame.Bradley@vermont.gov).



A monitoring well at the ground surface.

Funding provided by:

1) Lake Champlain Basin Program

2) Vermont Agency of Agriculture, Food, and Markets

To give permission for geologic mapping on your land and/or to volunteer for well testing, please send your name and address to : jon.kim@vermont.gov