Geologic Facts and Localities
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Lost Pond Spring, T4 Indian Purchase, Maine

45° 36’ 33.43” N, 68° 53’ 18.56” W

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Lost Pond Spring, T4 Indian Purchase, ME

Introduction

Maine is blessed with very abundant ground water resources which provide water via private and public wells to many of our homes and businesses. In addition, many of Maine’s agricultural crops also rely on irrigation water sourced from ground water to enhance production and in some cases, protect against frost damage. Even our numerous rivers and streams are believed to derive as much as 40% of their flow from ground water discharge (Caswell, 1987). Recent investigations indicate this portion of flow may be greater than 50 percent (Gordon, 2019). Typically, when water flows to the surface through natural openings under natural pressure and gradients, the feature is commonly termed a spring. Spring water has held a certain fascination, or even mystique, with people from early historical times to the present day. People are often mesmerized by the continuous swirling flow of water to the surface (Figure 1). The Maine Geological Survey (MGS) published an earlier discussion of springs in June, 1999 entitled “Maine Springs”.

Figure 1. Photo of a bubbling quick sand spring.
Types of Springs

Generally, there are two types of springs; **water table springs** and **artesian springs**. Water table springs occur in unconsolidated overburden deposits where the water table intersects the land surface in areas where there is a marked contrast in permeability. Such differences are often noted where ground water in a gravel deposit overlies a clay or till deposit. The ground water cannot easily pass downward through the hydraulically restrictive, finer grained deposit and tends to migrate laterally until it is allowed to discharge along a hill slope. This type of water table spring is often termed a **contact spring**. In cases where the water table simply intersects the land surface because of a cut or depression and there is no change in permeability, the resulting ground water discharge is often referred to as a **depression spring**. While contact and depression springs are often associated with unconsolidated deposits, they can occur in highly fractured bedrock settings as well and are often referred to as **plumbing-system springs**. Artesian springs occur where confined ground water under hydraulic pressure migrates upward through minor openings in a less permeable layer. Artesian springs are commonly observed in overburden deposits where a low permeability sediment such as clay, with some isolated pathways to the surface, overlies a comparatively higher conductive deposit such as sand and gravel. Such springs also occur in bedrock settings where a network of interconnected fractures receives recharge water from a higher elevation allowing for discharge through fractures at a lower elevation.

For a full summary of this information, refer to the section on springs in the [Ground Water Handbook for the State of Maine](#).
Lost Pond Spring is situated in T4 Indian Purchase approximately 9.5 miles to the southwest of Millinocket, Maine (Figure 2). This spring is located along the east flank of a northwest-southeast trending gravel esker deposit (Refer to Figures 4-7.). Based upon position on the landscape, adjacent hydrogeologic features, and a nearby boring, OW-93-14, revealing 29 feet of fine to medium sand over 2 feet of till over bedrock (Figure 3), it appears that this spring would be classified as a contact spring.

Figure 2. Location map of Lost Pond Spring site.

Figure 3. Sand and gravel aquifer map (Neil and Locke, 1998) showing spring site and location of OW-93-14.
Lost Pond Spring, T4 Indian Purchase, ME

Water Source
Lost Pond Spring derives its water from the gravel esker to the west and adjacent glacial outwash sediments along the esker flanks. Some water may also be derived from subsurface ground water outflow emanating from Lost Pond, a classic glacial kettle pond with an area of about 5.8 acres situated approximately 730 feet to the northwest. The wetlands to the east and northeast of the spring likely obtain much of their water from the sand and gravel aquifer (Figure 3).

Figure 4. Detailed topographic map showing spring site.

Figure 5. Surficial geologic map (Genes and Newman, 1986) of site showing gravel esker identified by the chevron pattern (>>>).
Water Flow

Lost Pond is immediately buttressed to the west by the nearby esker making for a strong likelihood for hydrogeologic connection.

Figure 6. Lidar hillshade image showing Lost Pond Spring site, Lost Pond, and esker ridge.
Water Flow

Typically, rain (precipitation) percolates downward through the unsaturated zone until it reaches the water table. From there, ground water flow is generally outward toward the sides of the esker.

**Figure 7.** Lidar hillshade image showing spring site, pond, and esker ridge with schematic ground water flow directions.
Figure 8. Schematic of possible ground water flow in gravel overburden deposits showing outflow from a kettle pond.
Lost Pond Spring’s idyllic setting is characterized by lush ferns, grasses, and moss under a canopy of pine, hemlock, and mixed hardwoods. The spring itself is partially enclosed by a small wooden building built on a log crib to keep debris from accumulating. Flow is directed under one side where it forms the beginning of a small brook flowing eastward (Figures 9-10). The spring itself is almost mesmerizing to watch as swirling clouds of fine sand move upward in what many people refer to as “boiling” (Figure 11). While this spring is NOT situated along a heavily traveled road or in a populated area, the Maine CDC recommends that roadside spring potability be examined carefully. In Maine Law, roadside springs are differentiated from public water supplies.
Figure 11. View of Lost Pond Spring showing continuous upward flow action. See a short video of the flow action. It should be noted that the distance between the water surface and the lower sediments is nearly four feet!!
Nearby Ground Water Quality and Level Data

MGS and the U.S. Geological Survey (USGS) mapped sand and gravel aquifers in the area in 1993. As part of this effort, an observation well was installed approximately 200 feet to the south of the spring. This well, identified as OW-93-14, was monitored for water level and samples were collected for water quality analyses. The results of this work are summarized in Neil, Locke and Nichols, 1998 and Neil and Locke, 1998. The USGS later decided to include this well in their network for Current Water Data for Maine which includes the ground water part of the USGS network for Current Ground Water Data for Maine. At this time, the well was renamed to USGS 453629068531801 ME-PEW 594 Millinocket, Maine. Water level data is electronically collected every hour and transmitted via satellite to provide the information in real time (Figures 12-13).

Figure 12. View looking northeasterly toward USGS 453629068531801 ME-PEW 594.

Figure 13. USGS Lead Hydrologic Technician, Andrew Cloutier, conducting equipment checks.
References and Additional Information


