

# MONITORING REPORT SUMMARY

2022

BRADBURY SPRING  
KINGFIELD, MAINE



MANAGING FOR SUSTAINABILITY

# ABOUT BRADBURY SPRING

Bradbury Spring is located in Kingfield, Maine, within the watershed of the West Branch of the Carrabassett River. The geologic conditions that support the Bradbury Spring site originated approximately 14,000 years ago when Maine was covered by continental glaciers. When the glaciers melted between 11,000 and 13,200 years ago, meltwater streams formed outwash deposits of gravel, sand, and silt. For approximately nine miles along the watershed below the southeast slope of Mt. Abraham, the West Branch flows over porous sand and gravel aquifer deposits that lie in the valley. The spring site is located on these glacial deposits, which are over 100 feet thick and have the potential to produce more than 50 gallons of water per minute. Approximately 36,700 acres of watershed drainage area is located upgradient from the spring site.

The valley aquifer deposits formed along the West Branch as a gently sloping fan-shaped topographic feature where the spring site is located. The land surface of the fan drops in elevation and intersects the water table, which is where the springs are located. Rain and snow that fall in the watershed recharge the aquifer and groundwater resource throughout most of the year. This natural cycle of water occurs throughout Maine and includes precipitation, runoff, infiltration to groundwater and evaporation/transpiration as illustrated in Figure 1.

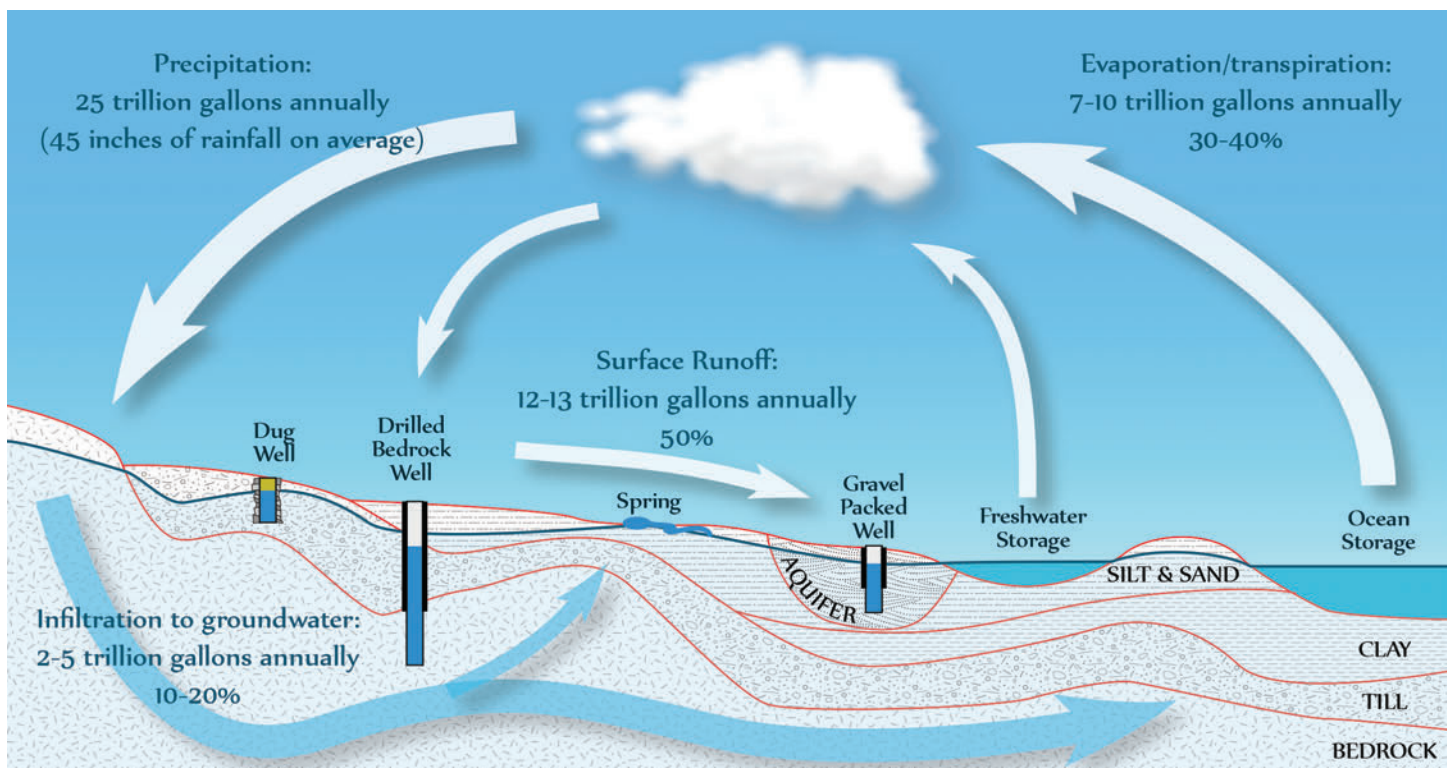


Figure 1: Maine's Water Cycle

## DEFINITION OF A SPRING

A spring is the location where groundwater (water that exists beneath the earth's surface) naturally emerges from the ground. Poland Spring withdraws water from boreholes at Bradbury Spring, intercepting a portion of the spring water that would otherwise naturally emerge from the ground. Groundwater naturally flows from west to east through the fan deposits present at the site. At the eastern edge of the fan deposit, the Bradbury Spring site contains active spring vents and diffuse spring seepage areas. From these natural features, groundwater merges into small streams and drainage channels that eventually flow into the West Branch southeast of the spring site.

## WATER WITHDRAWALS AND SUSTAINABILITY

Poland Spring's water withdrawals from Bradbury Spring are carefully regulated by permits from the Town of Kingfield and the Maine Department of Environmental Protection (DEP). In addition, Poland Spring has an agreement with the Kingfield Water District that requires Poland Spring to prevent any undue adverse effects on the quality and quantity of the District's water resources. The permits and agreement were based on extensive scientific hydrologic and hydrogeologic investigations conducted at the site and contain conditions that allow water extraction subject to specific performance standards. As a result, the permits and agreement provide a safety factor to protect the aquifer and its associated natural resources for long term sustainability.

Based on the extensive watershed area and precipitation recharge, the 200 million gallons (MG) per year withdrawal permitted for the site by the DEP represents slightly more than 1 percent of the aquifer recharge in an average year and approximately 2 percent of recharge in a drought year. Since water withdrawals began in 2008 at Bradbury Spring, the annual utilization has been less than 1 percent of the groundwater recharge that has occurred within the regional watershed.

**Poland Spring's withdrawals at Bradbury Spring are regulated by:**

- Town of Kingfield
- Dept. of Environmental Protection
- Dept. of Health & Human Services (Maine Drinking Water Program)

## SITE MONITORING

### Water Supply

The Town and DEP permits require Poland Spring to monitor the influence of withdrawal activities at groundwater, spring and surface water monitoring stations located at the site. Independent hydrogeologists contracted by Poland Spring oversee monitoring of the groundwater system, spring flow and surface water bodies located in and around the Bradbury Spring site. In addition, Poland Spring continuously monitors extraction rates at the spring water boreholes and a downstream flow location to ensure that adequate flows are maintained. Monitoring wells located in the vicinity of nearby residential wells are also monitored for water level changes to verify that Poland Spring's operations do not adversely affect groundwater at these neighboring sites. On-site biomonitoring of wetland and stream habitats was also conducted at the site over a five-year period after water withdrawals began.

Poland Spring submits monthly monitoring data and annual reports to the Town of Kingfield, the Kingfield Water District and the DEP, where it is publicly available, to document that there have been no adverse effects on local groundwater, surface water or natural resources in the lower West Branch watershed as a result of Poland Spring's withdrawal.

## RECENT MONITORING RESULTS

The following graphs summarize important measures of the health of the natural groundwater and surface water systems. The graph in Figure 2 depicts water levels typically observed in the Bradbury Spring Aquifer. The water levels in the aquifer naturally fluctuate by a few feet, depending on the season. Spring and fall rains typically lead to recharge of the aquifer, while growth and uptake of water by plants in the summer usually decreases aquifer water levels, as does the lack of recharge during winter months when the ground is frozen. Total annual precipitation under normal climate conditions has averaged 45 to 46 inches. From 1995 to 2004, total annual precipitation was below average and from 2005 to 2010 it was above average with peak precipitation totals occurring in 2005 and 2008. From 2015 to 2021, the Bradbury Spring site experienced below normal precipitation which resulted in drier than normal hydrologic conditions. In 2022, total annual precipitation recorded onsite was slightly above normal at 47.22 inches. In Figure 2, the graphs of three monitoring wells show since early 2007, groundwater levels were at their lowest in the fall of 2016. Groundwater levels then rose following 2016 in response to recharge events; however, the response to recharge was diminished due to an overall deficit of precipitation that occurred for the years from 2016 to 2022. This demonstrates through each year of the Bradbury Spring hydrologic cycle, that the site experiences a natural response to precipitation where the aquifer water levels fluctuate from year to year through dry and wet periods, which provide variable amounts of groundwater recharge into the site.

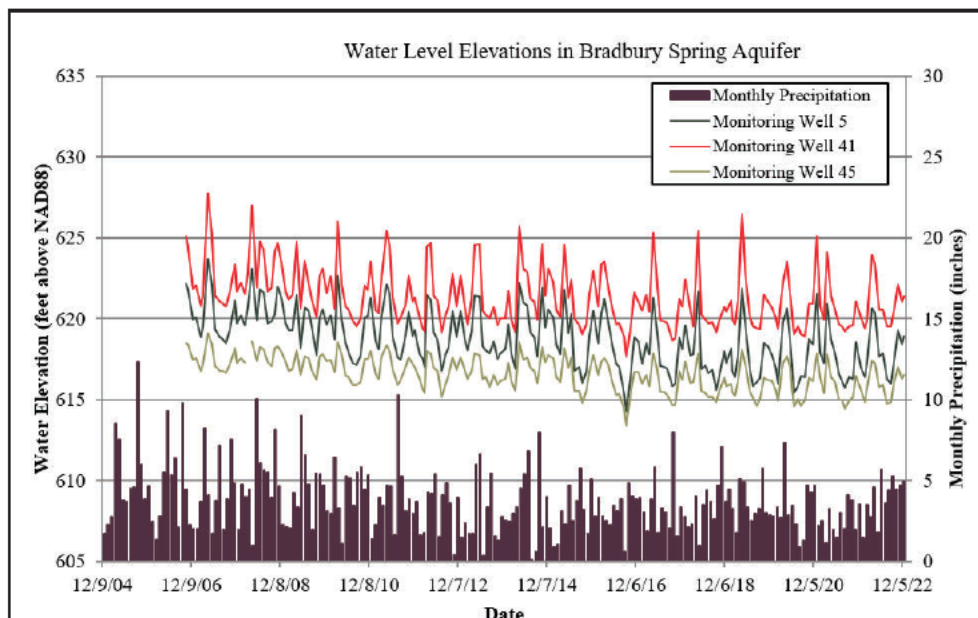


Figure 2: Groundwater Monitoring Data

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Surface water features respond similarly to the natural hydrologic cycles, as shown in Figure 3. Typically, melting snow and spring rains lead to increased surface water flows. Hotter, drier summer weather, combined with the uptake of moisture by plants, reduces available surface water flows. The DEP has set minimum stream flow requirements for the convergence of surface waters that flow through Poland Spring's monitoring location that is downstream from Bradbury Spring. Fluctuating low flow conditions occurred for a short duration in January and February due to frozen conditions and reduced runoff. In May, short-term lower flows were observed due to the timing and duration of spring snowmelt which primarily occurred in April and resulted in a diminished melting snowpack in May. Poland Spring communicated these conditions to the DEP as required in its permit. However, as expected stream flows naturally drop from year to year between the summer and fall seasons based on seasonal changes in temperature and precipitation. Despite these fluctuating seasonal trends, Poland Spring has complied with its permit conditions since spring water withdrawal for bottling began at Bradbury Spring in 2008.

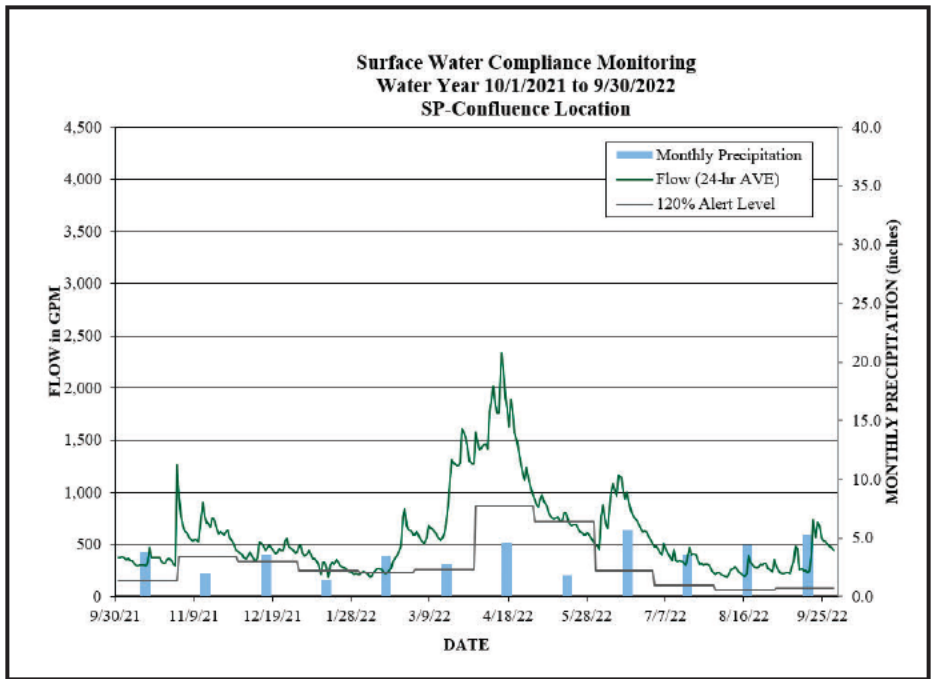


Figure 3: Surface Water Monitoring Data

## FUTURE MONITORING

Poland Spring takes its environmental stewardship responsibilities seriously and is committed to sustainable management of natural resources. Monitoring the groundwater, surface water, habitat and precipitation in Kingfield will continue for as long as Poland Spring withdraws spring water here.

## SUMMARY

Water withdrawals by Poland Spring at Bradbury Spring in Kingfield, Maine are overseen by its independent hydrogeologists, the Town of Kingfield, the Kingfield Water District and the DEP. Poland Spring manages for sustainability through proactive monitoring and responsible use. Water withdrawal activity has not resulted in adverse impacts to groundwater, surface water, wetlands, or other existing uses located in the area of the spring site.

**Monthly monitoring results are available to the public at the:  
Kingfield Town Office, 38 School Street, Kingfield, Maine 04947**

[Redacted contact information]