

# MONITORING REPORT SUMMARY

2022  
COLD SPRING  
DENMARK, MAINE



MANAGING FOR SUSTAINABILITY

# ABOUT COLD SPRING

Cold Spring is located in Denmark, Maine, within the Beaver Brook watershed. Beaver Brook flows from Beaver Pond to Pleasant Pond and then to the Saco River. The Beaver Brook watershed is approximately 4,640 acres in size and is dominated by Pleasant Mountain to the northeast and lower uplands to the south. The Cold Spring Aquifer is a body of permeable sand and gravel that exists beneath the Beaver Brook valley. The aquifer and associated sediments - all of which are mapped as significant sand and gravel aquifers by the Maine Geological Survey - are up to 90 feet thick. The valley filled with sand and gravel sediments during the recession of the continental ice sheet in Denmark approximately 12,000 to 13,000 years ago. As the ice sheet melted and receded to the north, active deposition of sediments occurred along the ice margin where meltwater flowed from the glacier. Today, the Cold Spring Aquifer is comprised of these thick sand and gravel features. Precipitation recharges the aquifer by infiltration, as gravity pulls the water down into the aquifer to become groundwater (Figure 1). Poland Spring withdraws water that falls as precipitation within the Beaver Brook watershed boundary and infiltrates into the Cold Spring Aquifer.

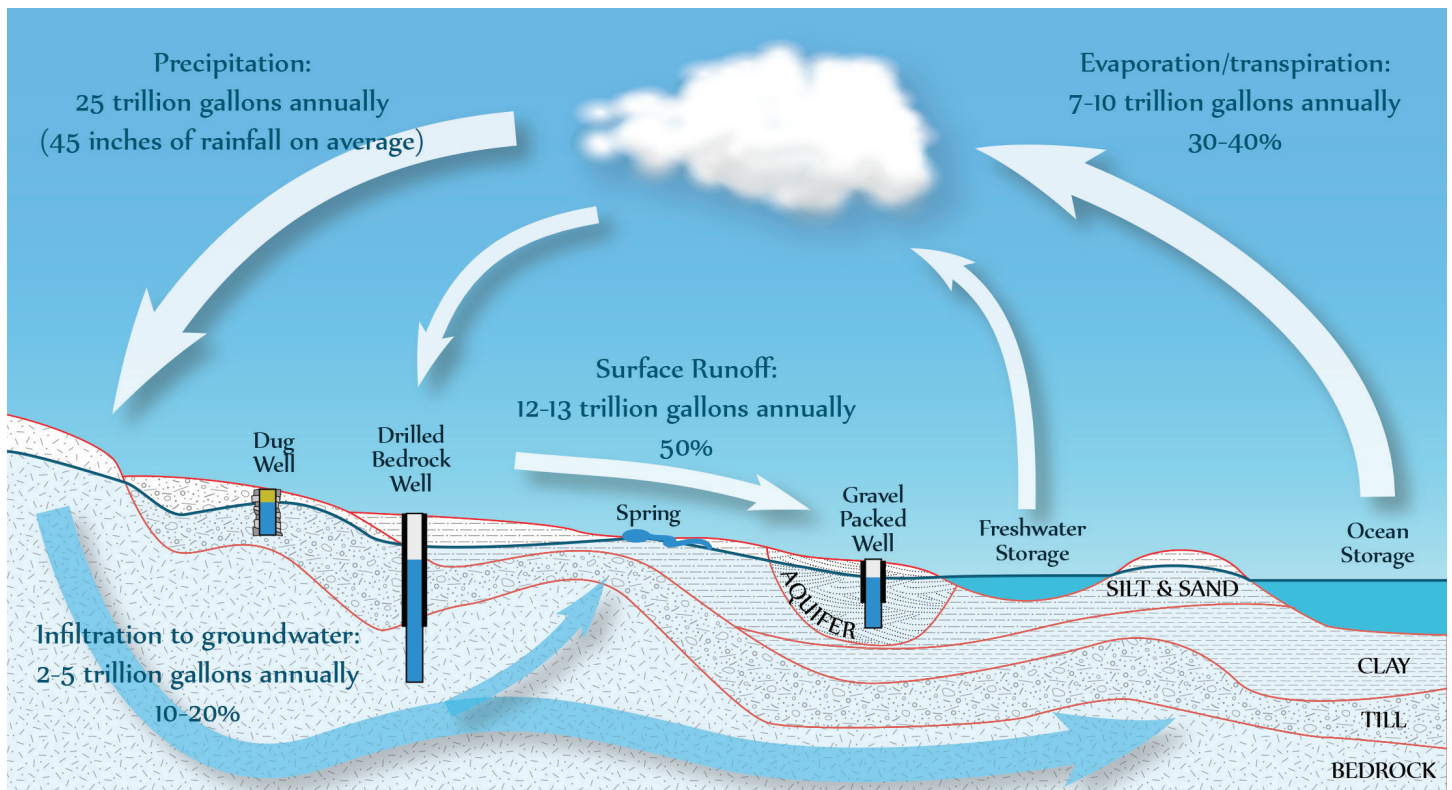


Figure 1: Maine's Water Cycle

# 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 two boreholes in Denmark, intercepting a portion of the spring water that would otherwise naturally emerge from the ground. Spring water is prevalent along Beaver Brook, between Rocky Knoll Road and Denmark Road, where Cold Spring is located. The spring water here eventually flows into Pleasant Pond, then the Saco River, and then on to the Atlantic Ocean.

# WATER WITHDRAWALS

The Town of Denmark and the Maine Department of Environmental Protection (DEP) regulate spring water withdrawal through the issuance of permits. In addition to extensive scientific investigations of the site, the Town of Denmark and the DEP established a series of permit conditions before issuing a water extraction permit. These performance standards protect the aquifer and other natural resources.

Hydrologic analyses and associated findings were used by the Town of Denmark to establish an extraction volume from Cold Spring sources of 105.1 million gallons (MG) of water in any given 365-day period. While this may seem like a large number, it is important to note that annually 5.8 billion gallons (BG) – 46.3 inches - of water (based on a 24-year average) fall on the watershed in the form of precipitation (*Source: Fryeburg Eastern Slopes Airport ICAO Station KIZG, Northeast Regional Climate Center*). Therefore, if Poland Spring were to withdraw the maximum amount allowed by its permit, the withdrawal would represent less than 1.8% of the precipitation that falls in the watershed area annually.

**Poland Spring's water withdrawals from Cold Spring are regulated locally and at the state level by:**

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

# SITE MONITORING

## Water Supply

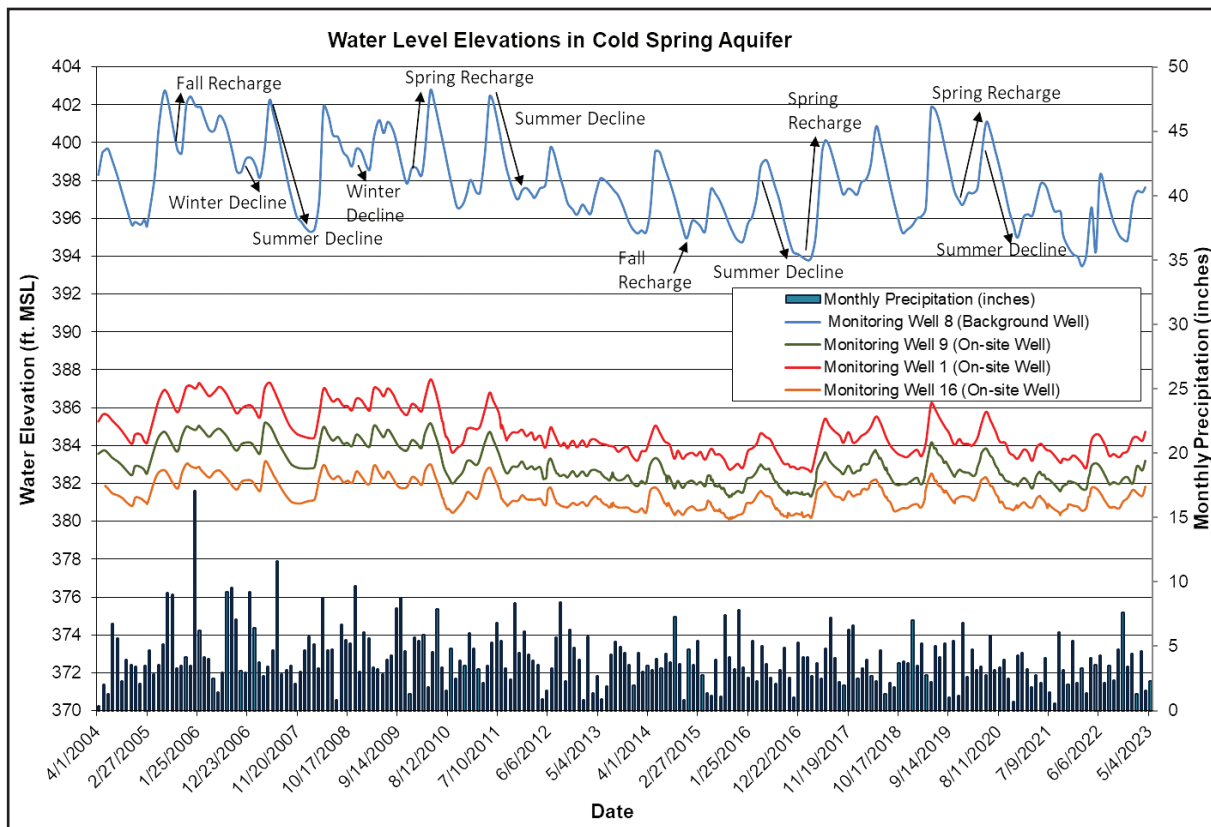
Independent scientists contracted by Poland Spring regularly and thoroughly monitor the groundwater system, springs, wetlands, residential wells, and surface water bodies in and around the Cold Spring Aquifer. Poland Spring continuously monitors extraction rates at the spring water boreholes and monitors stream flow at two stations along Beaver Brook. Additionally, water levels in a network of nearby residential wells are monitored on a daily basis via automated data loggers deployed in these wells. These considerable monitoring efforts ensure that Poland Spring's operations do not adversely affect the groundwater, surface water, natural environments, or neighbors. These independent scientists submit weekly and/or monthly monitoring data to the Town of Denmark and annual reports to the DEP.

## Wetland Health

Poland Spring also assesses wetland health of nearby wetlands through wetland monitoring. The independent scientists who conduct these assessments submit annual reports on wetland health to the Town of Denmark and the DEP.

# RECENT MONITORING RESULTS

The graphs below summarize important measures of the health of the natural groundwater and surface water systems. The graph in Figure 2 depicts water levels and monthly precipitation observed in the Cold Spring Aquifer dating back more than 18 years.

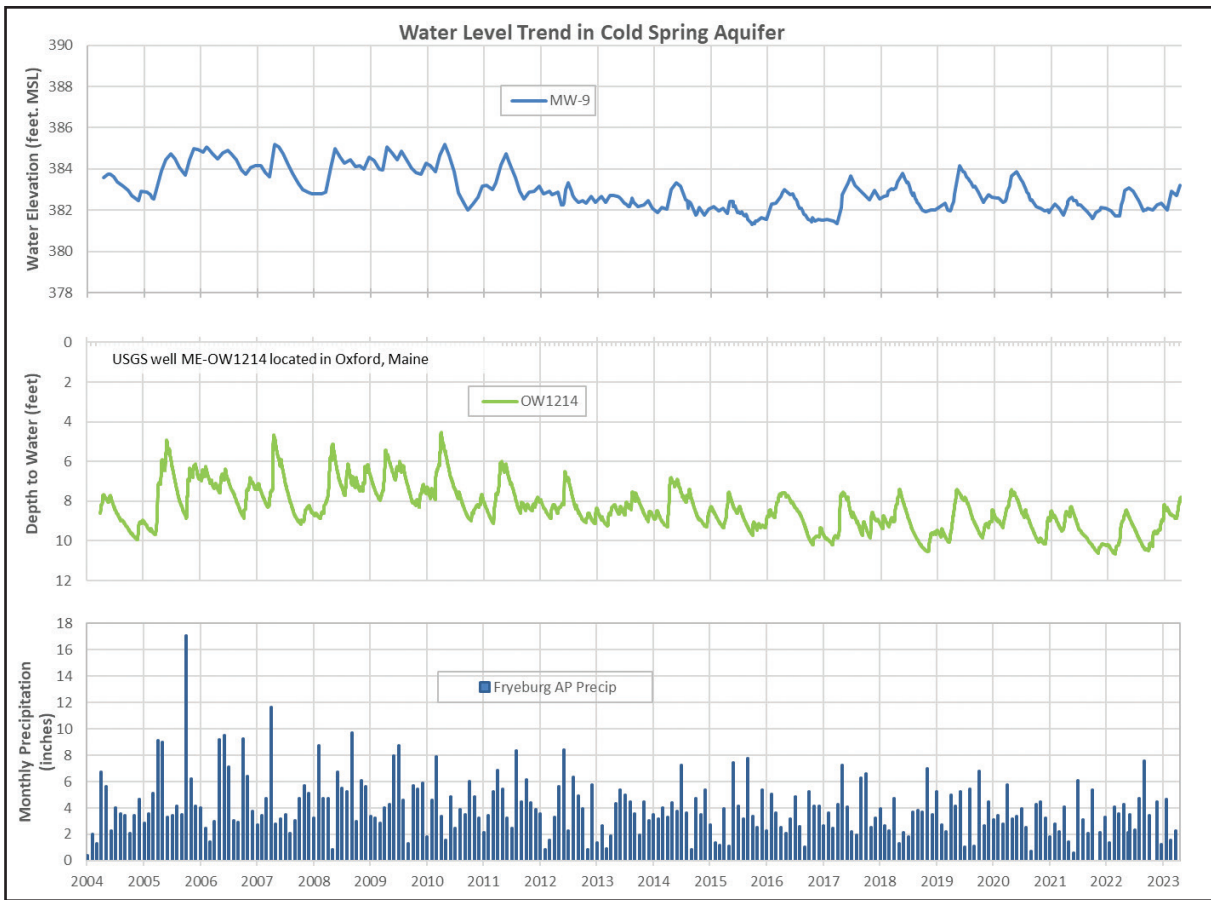


**Figure 2: Groundwater Monitoring Data**

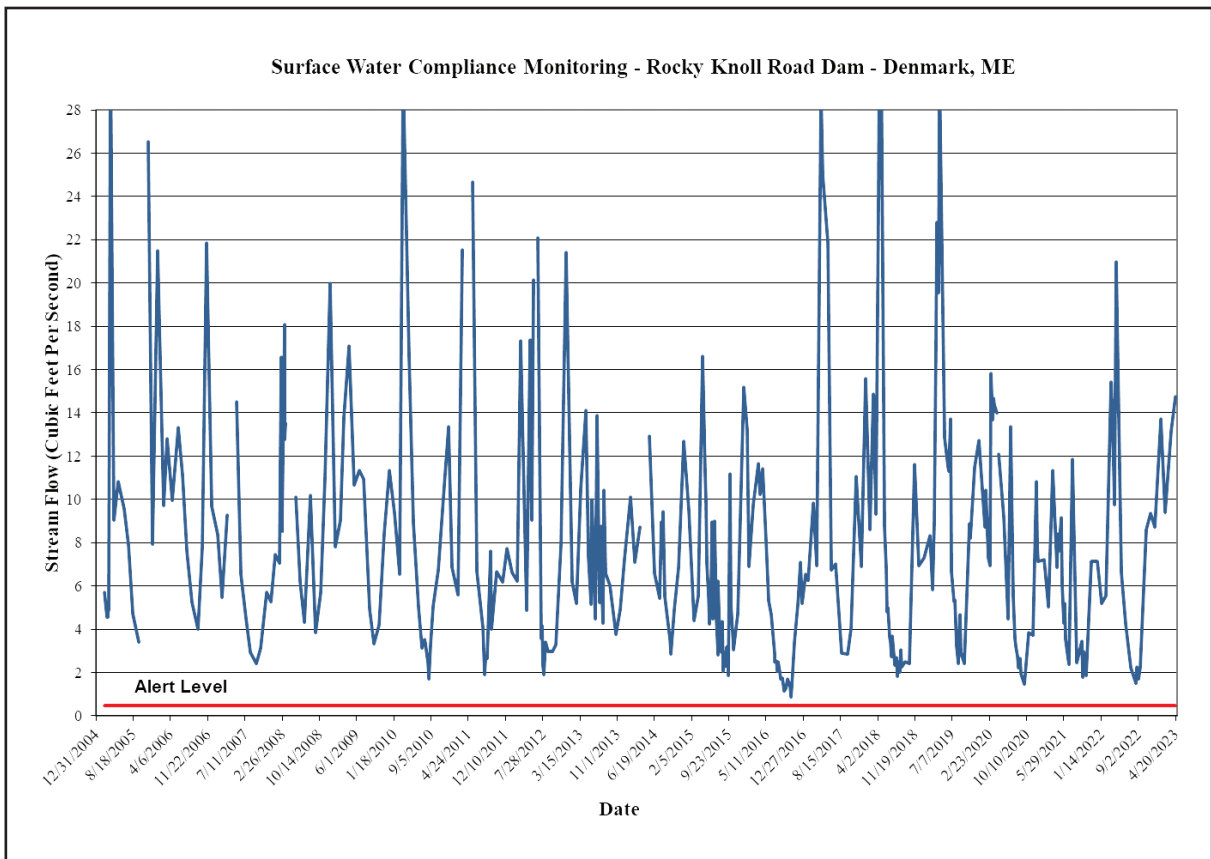
The graph in Figure 3 shows water levels at MW-9, which is an overburden monitoring well centrally located at Cold Spring. For comparison, water levels from U.S. Geological Survey (USGS) well MW-OW1214 along with monthly precipitation are also presented. This USGS well is located in Oxford, Maine, outside of the Cold Spring Aquifer, and is also an overburden monitoring well. The water levels in the Cold Spring Aquifer naturally fluctuate by a few feet, depending on the season and the amount of precipitation. Spring and fall rains typically lead to aquifer recharge, 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. Inspection of the graphs indicate that fluctuations of precipitation each year correlates with trends of groundwater levels measured at on-site monitoring well (MW-9). These same trends are also observed in the USGS well (Figure 3).

The Town of Denmark has established minimum groundwater level requirements tied to the Poland Spring permit. Groundwater levels remain above the minimum requirements since commercial water withdrawal began at Cold Spring. Years of monitoring data have shown that Poland Spring’s activities have not resulted in adverse impacts on these natural cycles.

Surface water bodies respond similarly to these natural cycles, as shown in Figure 4. Melting snow and spring rains lead to increase surface water flows. Hotter, drier summer weather, combined with uptake of moisture by plants, reduces available surface water flow. The Town of Denmark has set minimum stream flow requirements for Beaver Brook that Poland Spring must meet. Stream flow has met the minimum flow requirements since commercial water withdrawal began at Cold Spring.



**Figure 3: Monitoring Well Data**



**Figure 4: 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 Denmark will continue for as long as Poland Spring withdraws spring water here.

## **SUMMARY**

Water withdrawals by Poland Spring at Cold Spring in Denmark, Maine are overseen by the Town of Denmark and its independent hydrogeologist (St. Germain Collins) along with the Maine 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 natural resources.

**Monthly monitoring results are available to the public at the  
Town of Denmark, 62 East Main Street, Denmark, Maine.**

**Questions about Cold Spring or the monitoring information  
contained in this summary report should be directed to:**

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