

Summary of Water Testing Results at Holland Lake

Due to issues with the wastewater treatment lagoon that serves the Holland Lake campground and Holland Lake Lodge, the Forest Service followed direction from Montana Department of Environmental Quality (DEQ) to conduct a groundwater assessment to identify locations for upgradient and downgradient monitoring wells between the lagoon and the lake to determine possible impacts to surface and groundwater. The Forest Service consulted with DEQ and completed the installation of three groundwater monitoring wells to monitor for contamination.

On October 19, 2023, effluent samples were collected from the aeration pond. On November 9, 2023, surface water samples were taken from the north shore of Holland Lake. Once installation of the three monitoring wells was completed, groundwater samples were taken on November 27. All samples were sent to Montana Environmental Laboratory LLC to be tested for the water quality attributes requested by DEQ. DEQ (the regulating authority) evaluated these test results, and provided the following statement, which was included in the December 15 news release: *"We are pleased the samples showed no contamination of ground or surface water,"* said DEQ Water Quality Division Administrator Lindsey Krywaruchka.

The following information was reviewed by DEQ.

Wastewater Lagoon Water Quality Results

Samples showed that the nitrogen level in the aeration pond was 47.4 mg/l. Nitrogen, phosphorus, and dissolved oxygen levels are primary attributes used to track wastewater pollution. Nitrogen and phosphorus are nutrients that can cause excessive algal growth and reduce dissolved oxygen levels.

As a precautionary measure, the Holland Lake water samples were also tested for e.coli bacteria contamination. All three test results were <1 mpn/100 ml. The DEQ standard for e.coli is 126 mpn/100 ml.

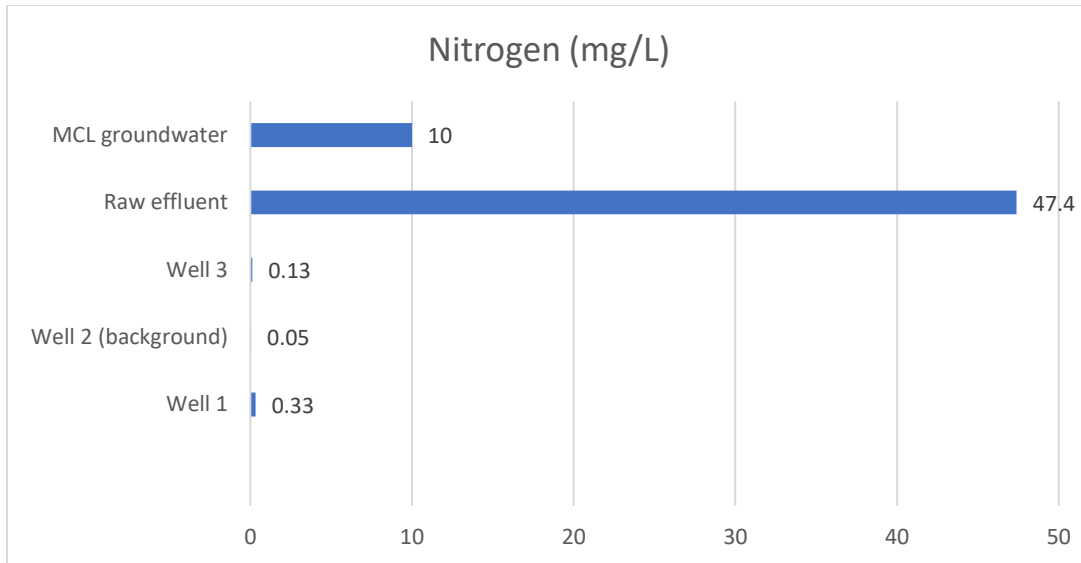
Groundwater Quality Standards and Results

In order to determine the correct groundwater flow direction and to determine background and potentially impacted groundwater, three monitoring wells were drilled: one upgradient of the lagoon, one cross-gradient from the lagoon and one downgradient from the lagoon in the direction of groundwater flow.



The upgradient well was used to determine background water quality of the aquifer, where it could not have been impacted by a leak. The cross-gradient well was used to determine the groundwater flow direction but was also sampled for water quality. This third well should have shown signs of contamination, had any been present.

DEQ standards limit nitrogen in groundwater to no more than 10 mg/l. Samples showed the background (not impacted by any potential leakage) to be 0.05 mg/l nitrogen, 0.11 mg/l phosphorus and 8.14 mg/l of dissolved oxygen. Samples showed the downgradient well (third well) to be 0.13 mg/l nitrogen, 0.21 mg/l phosphorus and 7.78 mg/l dissolved oxygen. These levels are close to the background well and 350 times less than the raw effluent at 47.4 mg/l.



Surface Water Quality Standards and Results

In order to determine if Holland Lake had been directly impacted by wastewater, the USFS collected three samples near the shore. Holland Lake has been classified by the DEQ as a Class B-1 High Quality Surface Water. Class B-1 surface waters are limited to a maximum of .3 mg/l total nitrogen and .03 mg/l total phosphorus. We know that background nitrogen and phosphorus in Holland Lake averages 0.10 and 0.004 mg/l based on data collected by the Whitefish Lake Institute. The surface water samples collected by the USFS showed near-shore average nitrogen levels of 0.01 mg/l. Near-shore average phosphorus level was 0.009 mg/l. These results indicate Holland Lake has not been negatively impacted by wastewater leakage.

The Forest Service continues to work with DEQ to develop a longer-term water quality monitoring plan for the area and more sampling of groundwater and surface water will take place in the coming months.

