



Pit Lakes

What causes a pit lake?

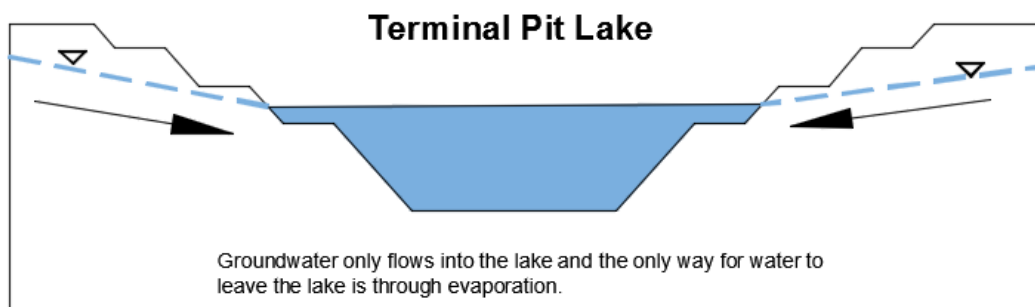
A mine pit lake (more often simply called a pit lake) is the result of open-pit surface mining operations. Open pits are excavated to extract a large ore body, and when these open pits are deeper than the water table the mining company needs to pump groundwater from them continuously to allow for mining to take place. Once the ore body is depleted, the pumps that are keeping the pit dry are turned off and the open pit floods with water. The flooding process generally continues for a number of years until the lake surface is approximately equal to the original elevation of the water table.

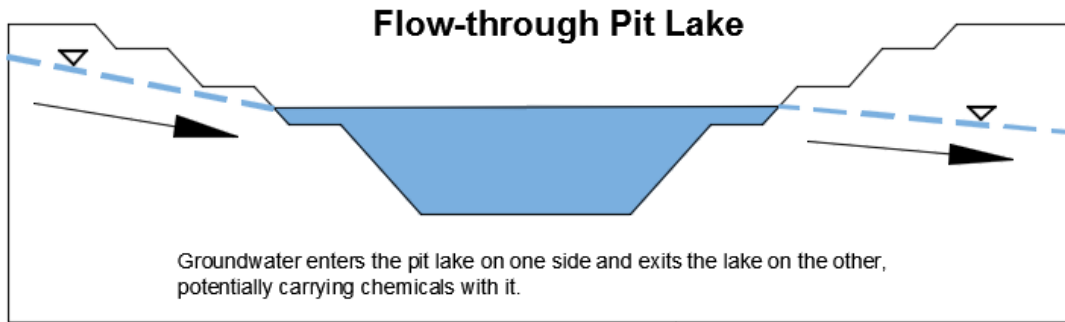
What laws govern pit lake water?

The Nevada Division of Environmental Protection (NDEP), Bureau of Mining Regulation and Reclamation oversees mining operations in the state according to parts of the Nevada Administrative Code (NAC). There are several specific regulations in the NAC that are applicable to pit lakes including NAC 445A.424 and NAC 445A.429. The former states, generally, that mining operations cannot degrade the quality of groundwater below pre-defined standards, or the water quality in the area before it was mined. The second regulation (NAC 445A.429) is more specific to pit lakes and states that, in addition to not degrading groundwater, pit lakes cannot pose an adverse threat to human, terrestrial, or avian life.

Are there different types of pit lakes in Nevada?

Somewhat surprisingly, there are several different types of pit lakes, with the major distinction being if groundwater only flows into the pit lake or if some water from the lake can flow back out into groundwater. The first type is called a “terminal lake”, which refers to the pit being the end (termination) of the flow of groundwater in the area (i.e., a “low spot”); see Figure 1. For terminal pit lakes the only way for water to escape is through evaporation. The other type of pit lake is called “flow-through”. This term is used to describe groundwater that enters the pit through one area and flows out in another. In this case, it is possible that some constituents of concern in the pit wall dissolve and the impacted water could migrate into the aquifer. The diagrams below show the two different types of pit lakes.





What standards must a pit lake in Nevada meet?

Pit lakes in Nevada have to meet different water-quality standards based on which type of lake they are (see the FAQ on flow-through versus terminal pit lakes). If a pit lake is terminal then the water quality is compared to the NDEP Profile III reference value list. This list is focused on evaluating risk to lifeforms, because if the lake is terminal no lake-water can escape and the main goal is to protect human, terrestrial, and avian life. If the pit lake is flow-through then the water quality is compared to the NDEP Profile I reference value list. This list of chemicals is essentially a drinking water standard and is used to protect Nevada's groundwater. The Profile I and Profile III reference lists contain many of the same chemicals, but the Profile I list is generally more strict in the maximum allowable concentrations.

Are all pit lakes contaminated?

It is a common misconception that all pit lakes are contaminated and are poor-quality water. On the contrary, many of the pit lakes in Nevada have good-quality water and provide for communities of plant and aquatic life. Even though most Nevada pit lakes display good-quality water, some do require treatment and ongoing remediation.