Great Basin Resource Watch

Pit Lakes in Nevada

Recommendations for Public Policy

Nevada Mining Oversight and
Accountability Commission
February 15, 2022

Great Basin Resource Watch

GBRW is a non-profit organization founded in 1994. We work with communities to protect their land, air, and water from the negative affects of mining and resource extraction.

http://www.gbrw.org

Amount of Water Destined for Pit Lakes

Estimated Final Pit Lake Volumes

Site	Volume When Full (AF)	Evaporation (af/y)
McCoy Cove	35,000	645.2
Goldstrike	360,000	2,769.0
Gold Quarry	175,000	1,446.9
Lone Tree	129,900	1,560.9
Twin Creeks	128,558	1,532.7
Crossroad	143,220	1,049.1
Cortez Hill	79,931	698.1
Round Mountain	179,000	1,536
Anaconda	41,800	
Robinson Liberty main	1,300	141
Robinson Ruth combined	85,000	1,100
Sleeper	37,000	140
Marigold	27,592	502
Total	1,423,301	> 13,120

Total ~1,420,000 AF
450 billion gallons

Lake Lahontan
312,000 acre-feet (maximum)

Rye Patch Reservoir
213,000 acre-feet (maximum)

Las Vegas – 2020 use
178 billion gallons

Water Quality of Pit Lakes

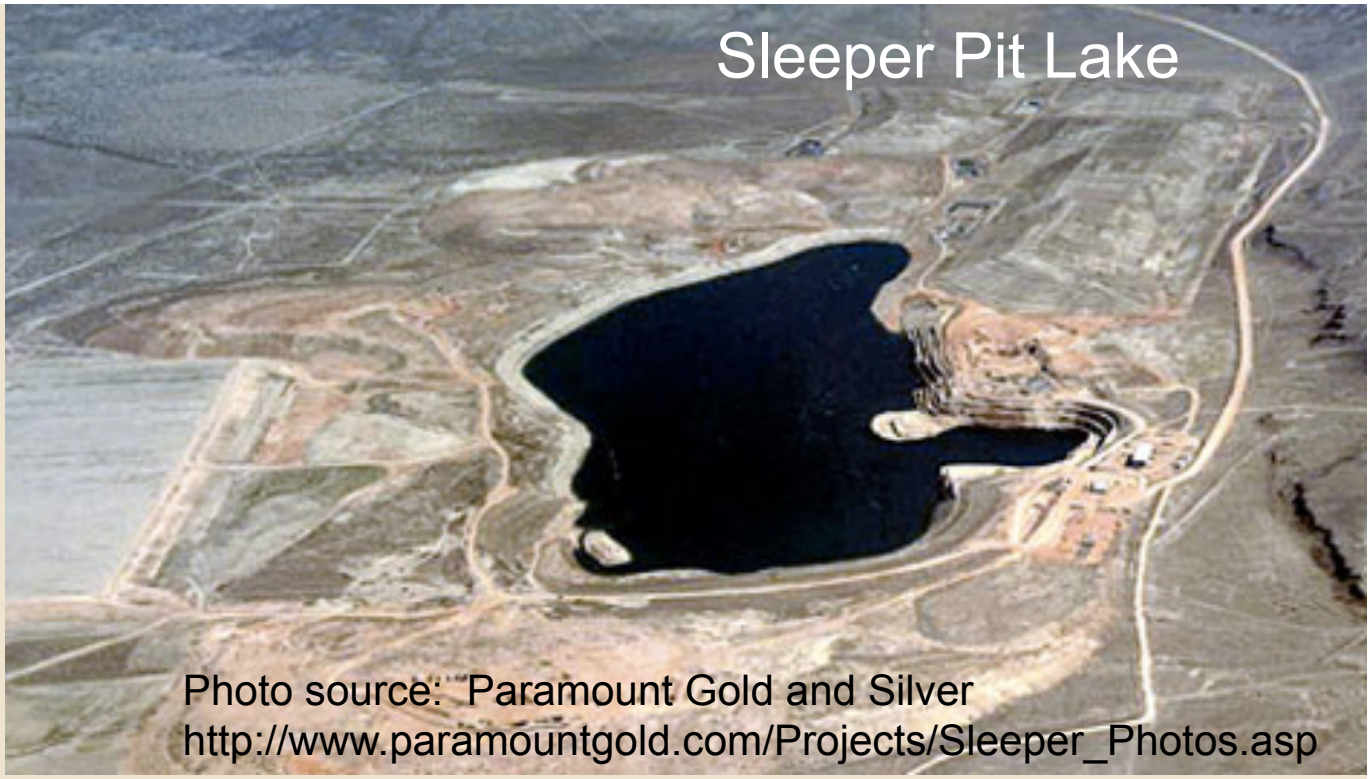
The water quality can often be very poor, especially early in pit lake development.

- Was the case for the Sleeper pit lake northwest of Winnemucca.
- Is the case for the Lone Tree pit lake – one mile from the Humboldt River, west of Battle Mountain.

Lone Tree pit lake
April 2009

In the third year of filling.

Pit Lakes Can Be Useful



Sleeper had very poor water quality, but since treatment it now could be of recreational value and perhaps other beneficial water uses.

Lone Tree pit lake will probably eventually be non-acidic and could be reclaimed for a beneficial use..

Water Quality – Sleeper and Lone Tree

In both pit lakes acidic conditions appeared early on.

- Sleeper was treated with ~12,000 tons of lime 1996-1998.[1]
- Lone Tree was treated with lime – cumulatively ~74,000 tons, and 10,000 tons of Trona as of 2016.[2] Trona is still being added as of 2021.[4]

Sleeper pit lake water quality has been stable for at least 5 years

- pH - 7.4-8.4 (not acidic, "circumneutral")[3]
- Elevated constituents: TDS – 2500-2600 [500-1000], Sulfate - 1300-1500 [250-500], Manganese – 0.008–0.33 [0.05-0.1].[3]

Groundwater monitoring wells at the Sleeper site sample the same aquifer that supplies the pit lake, and show better water quality.

- No exceedences
- TDS – 700-800, Sulfate – 130-150, Manganese - <0.002[3]

Sources
[1]Richard Boak, Geoff Beale, "Mine Closure and Reclamation - Practical Examples of Options and Issues," Proceedings -10th International Mine Water Association Congress, 2008.
[2]Newmont, "Lone Tree Pit Lake 2016 Trona Test Update," November 2 2016.
[3]NDEP, "Sleeper Mine Water Pollution Control Permit NEV50006 Annual Report 2011.
[4]NDEP, Third Quarter Monitoring Report, NEV0090058," Oct 2021.

Our Responsibility

Water bodies such as many human made reservoirs and certainly pit lakes fall outside of the Clean Water Act. It is our responsibility as Nevadans to protect these waters.

NRS 445A.305 Legislative declaration.

2. The Legislature declares that it is the policy of this State and the purpose of NRS 445A.300 to 445A.730, inclusive:

(a) **To maintain the quality of the waters of the State** consistent with the **public health** and enjoyment, the propagation and **protection of terrestrial and aquatic life**, the **operation of existing industries**, the pursuit of agriculture, and the economic development of the State; and

(b) To encourage and promote the use of methods of waste collection and pollution control for all significant sources of water pollution (including point and diffuse sources).

"Beneficial Use" of Nevada Water

Mining pit lakes result almost entirely from groundwater seepage
•Groundwater is better water quality than in the pit lake
•Typically the groundwater could have a number of beneficial uses prior to its diffusion into a pit lake.
•Are waters of the State.

Even though state law allows for designation of a beneficial use by NDEP of pit lake it has yet to happen. Are we wasting our water?

NRS 534.020 Underground waters belong to public and are subject to appropriation for beneficial use; declaration of legislative intent.

2. It is the intention of the Legislature, by this chapter, to **prevent the waste of underground waters and pollution** and contamination **thereof** and provide for the administration of the provisions thereof by the State Engineer,…

Pit Lakes will sit Fallow and Dangerous

With no beneficial use for pit lakes no safe access will be required in the reclamation process. The lakes will be fenced off to prevent human intrusion.

Over time, given human nature, people will try to access pit lakes, especially if they support aquatic life.

Pit lake sidewalls can be treacherous. As seen here at Lone Tree – Jan. 2011
Photo: Terry Dempsey

Nevada Statues and Regulations

Water Quality Requirement

NAC 445A.429 Procedures required to prevent release of contaminants; requirements concerning impoundments. (NRS 445A.425, 445A.465)

1. The holder of the permit must institute appropriate procedures to ensure that all mined areas do not release contaminants that have the potential to degrade the waters of the State.

2. Open pit mines must, to the extent practicable, be free-draining or left in a manner which minimizes the impoundment of surface drainage and the potential for contaminants to be transported and degrade the waters of the State.

3. Bodies of water which are a result of mine pits penetrating the water table **must not create an impoundment which:**

(a) Has the potential to degrade the groundwaters of the State; or

(b) Has the potential to affect adversely the health of human, terrestrial or avian life.

4. The holder of a **permit may apply to the Commission to establish a beneficial use with a level of protection less than that required by paragraph (b)** of subsection 3 for water impounded in a specific mine pit.

Nevada Statues and Regulations

Problems with NAC 445A.429

- Only in terms of a "potential" to degrade groundwater or adversely affect human, terrestrial or avian wildlife.
- When is this probability so small that the potential to degrade groundwater or adversely affect human, terrestrial or avian wildlife does not exist?
- The determination is dependant upon technical analysis often with high levels of uncertainty.
- Water quality prediction for pit lakes are often far off the mark.
- According to this regulation the Nevada State Environmental Commission has the authority to establish a beneficial use for a pit lakes, but the Commission denied this in GBRW's Mt Hope permit appeal.

Predictions of Water Quality for Lone Tree Pit lake

- GBRW has tracked four models that attempted to predict water quality for the pit lake – 1991, 1995, 1998, 2004.
- All missed substantially the mark on acidity and generally on toxic metals concentrations.
- Had a pre-permitting model been accurate the pit lake would likely not have been allowed.
- Alternatively, if a beneficial use is established for the pit lake then there will be a required numerical standard to be met.

Nevada Statues and Regulations

Reclamation of Mining Pit Lakes

NRS 519A.230

3. Except as otherwise provided in this subsection, **for a pit lake** that will have a predicted filled **surface area of more than 200 acres**, a plan for **reclamation must provide**, in consultation with the operator and each landowner, including any federal land manager, and, if feasible, for at least one **point of public nonmotorized access to the water** level of the pit lake when the pit in which the pit lake is located reaches at least 90 percent of its predicted maximum capacity. This subsection:

(a) Must not be construed to impede the ability of any landowner, including any federal land manager, of any premises on which a pit lake is located to determine the final and ultimate use of those premises;

(b) **Does not require any landowner, including any federal land manager, who is consulted pursuant to this subsection to agree to allow access to any pit lake; and**

(c) Does not alter any contract or agreement entered into before October 1, 2013, between an operator and a landowner, including any federal land manager.

Bold red text added for emphasis.

Nevada Statues and Regulations

NRS 519A.230 limitations

- Limited to over 200 acres
- Post mining use of the water in the pit lake is not required
- The public access to mining pit lake is easily denied
- There are no parameters on what is considered feasible

The most recent change in the NRS from about 10 years ago does nothing to meaningfully address the water wasted in mining pit lakes.

GBRW Recommendation

Our state agencies need legislative direction:

➢To require that any proposed mine have a plan for a post-mining use of a pit lake – specifically a beneficial use for the water.

- ✓ By establishing a beneficial use for the there will be a water quality required – a standard to be met
- ✓ Eliminates the uncertainty in NAC 445A.429
- ✓ Is completely under the control of Nevada unlike land ownership
- ✓ Determination of beneficial use needs to require a public hearing, so the directly affected community can provide the top uses
- ✓ Beneficial use should be established after mine closure by the end of the 30 year monitoring period

GBRW Recommendation

- To require existing mines with a plan of operations that involves mining below the premining water table to conduct a feasibility analysis for a post-mining beneficial use for a pit lake, and if infeasible, the mine could apply for an exception to reclaim the pit lake and establish a beneficial use.
  - ✓ The feasibility decision should be based on more than a cost analysis
  - ✓ The technical and economic analysis should explore a number of options for beneficial use and delineate in detail how the mine plan will need to be structured to facilitate the beneficial use
  - ✓ The feasibility analysis should require a public review including an appeal process on the feasibility decision

GBRW Request to this Commission

To conduct a hearing to investigate fully how to implement a policy for post mining uses of mining pit lakes and establishment of beneficial use.

As a result of the hearing propose with public input changes to the Nevada NRS to establish beneficial use requirement for mining pit lakes and process for implementation.

Direct NDEP to develop, with industry and public input, the criteria for post-mining uses of pit lakes, including:

- Safe public access
- Beneficial uses
- Funding instruments
- Schedule for attainment

Old Helms Pit Put to Good Use

Now, the Sparks Marina

The Sparks Marina is clean, hosted by unreactive gravel. Pit lakes in most metal mines will fill with worse water, but with active management any beneficial use is possible.

What a Waste!

Yerington Pit Lake - 2005