



LEMMON VALLEY

| ITEMS | DESCRIPTION | ADVANTAGES | DISADVANTAGES | TIME TO COMPLETE | LONG/SHORT TERM | FEDERAL FUNDING | WHAT STATE AGENCY MAY NEED TO BE INVOLVED | WHAT FEDERAL AGENCY MAY NEED TO BE INVOLVED | WILL IT REQUIRE A PERMIT |
|---|--|--|--|---|-----------------|-----------------|---|--|--------------------------|
| Natural Evaporation | Allow natural forces to evaporate the basin. | No additional costs. Lowers water level approx. 2.5 ft per year (~3500 acre feet of water) | Requires ongoing maintenance and operations related to existing barrier system. | Dependent on climate/weather conditions. Research related to past natural evaporation shows a timeframe of roughly 6-8 years for complete evaporation. | Long Term | N/A | N/A | N/A | No |
| Mechanical Evaporation | Rent large evaporators to increase the evaporation rate. (This option was considered assuming they would run during daylight hours and is based on the manufacturer's information for evaporation rates. The surface area of the lake is currently approximately 1,200 acres.) | Lowers water level in the basin. | Need 120 evaporators working for 1 year to evaporate an additional 1 foot of water. (One machine evaporates 10 acre feet of water in 12 months.) Will require substantial electrical infrastructure all around the lake. | Based on the information provided to Washoe County and depending on the number of units used, one unit can remove approximately 10 acre feet of water in one 12 month period. | Short Term | Potential | (NDEP) Nevada Department of Environmental Protection | N/A | Yes |
| Truck Water out of Basin | Truck the water to a different location. | Lowers water level in the basin. | Adds traffic to the roadway network. Discharge permitting will be problematic. Takes too long. (Natural evaporation is quicker.) | Using one fill station to fill twelve, 1,200 gallon water trucks per hour with a haul time of 20 minutes (just out of the hydrographic basin) to remove 1 vertical foot of water (1,200 acre feet or 391 millions gallons of water) will take 2.5 years hauling 24 hours a day. | Short Term | N/A | (NDEP) Nevada Department of Environmental Protection | N/A | Yes |
| Drill/Infiltrate | Drill into the aquifer and drain the water into it. (The lake sits above a thick clay layer that does not allow the water to infiltrate into the ground, and therefore into the aquifer.) | Storage of storm water in an aquifer for later use as groundwater. | Injection of water into the aquifer cannot physically be done in a rapid manner. NRS 445A.490 prohibits injection of water that has the potential to degrade underground sources of drinking water. Permitting of injection wells will be problematic. | This process could take multiple years to complete. | Long Term | Potential | (NDEP) Nevada Department of Environmental Protection | (BLM) Bureau of Land Management (property owner) | Yes |
| Excavate/Dredge | Dredge the bottom of the lake to create more capacity. (Mitigation of 1 vertical foot of water elevation at the current lake level (4922') would equate to approximately 1.8 million cubic yards of export material from the lake bottom.) | Can mitigate and create excess volume. | Excavation on federal land would enact a possibly lengthy environmental permitting process. Clay materials are not useful for construction so a location to deposit the material would need to be found. Excavation increases storage volume, but since it does not increase surface area, it does not improve natural evaporation. | This process could take multiple years to complete because it will require lowering of the lake level prior to being able to excavate in the lake bottom. | Long Term | Potential | (NDEP) Nevada Department of Environmental Protection; (NDOW) Nevada Department of Wildlife | (BLM) Bureau of Land Management (property owner) | Yes |
| Levee/Elevate Lemmon Drive | Build a levee around the lake in connection with an elevated roadway. | Maintain existing wetlands. | Environmental and visual impacts. High cost and liability to maintain levees. Risk of levee failure. Would require additional drainage infrastructure and pumping to manage stormwater across the levee. These infrastructure and pumps must be perpetually maintained. Reducing lake area with levees also reduces natural evaporation. | This process could take multiple years to complete. | Long Term | Potential | (NDEP) Nevada Department of Environmental Protection; (NDOW) Nevada Department of Wildlife; Nevada Division of Dam Safety | (BLM) Bureau of Land Management (property owner) - (FEMA) Federal Emergency Management Administration - possible Army Corps of Engineers | Yes |
| Pumping | Pump the water out of the hydrographic basin. (The approximate amount of water to remove 1 vertical foot of water level is 391 million gallons or 1200 acre feet of water.) | Maintain existing wetlands. | Some environmental impacts to rangeland for pipeline construction. Determination of final location for water needs to be determined, but additional flow/water could create new problems in a new location. | This process could take multiple years to complete. | Long Term | N/A | (NDEP) Nevada Department of Environmental Protection; (NDOW) Nevada Department of Wildlife | (BLM) Bureau of Land Management possible (BIA) Bureau of Indian Affairs | Yes |
| Buy Homes | FEMA Hazard Mitigation Grant for purchase of properties in the area to remove the future impact of a repeat event. | Removes select homes from harm. Maintains greater surface area of the lake, thus improving natural evaporation. | Housing costs may not allow those in the program to purchase in the area. | The HMGP program requires completion within 2 years. Upon award from FEMA all efforts will be made to complete within 12 months. | Long Term | Yes | (NDEM) Nevada Division of Emergency Management | (FEMA) Federal Emergency Management Administration | No |
| Elevate Homes/Septic system and Roadways | Raise homes to keep the water out of them. | Home is raised above the floodplain. (All homes built after 1984 are built above the floodplain.) | Many of the homes in the area are on individual septic systems, many of which cease to function when the ground is saturated with water. Access to the home from the street and driveway was not possible as was seen early in 2017 where many homes were islands. Does not raise the property, only the home. | This process could take approximately 6-12 months. | N/A | Unknown | (NDEP) Nevada Department of Environmental Protection; (NDEM) Nevada Division of Emergency Management | (FEMA) Federal Emergency Management Administration | Yes |
| Diversion of Upstream Flows | Capture stormwater flows from the slopes of Peavine Mountain and re-route to the Truckee River Basin and away from the closed hydrobasin. | Alleviates rise in lake level attributed to stormwater flows from Peavine Mountain. | Diverts water that traditionally recharges the hydrobasin aquifer. Does not allow some stormwater to reach Swan Lake. Routing these flows to the Truckee River may have adverse water quality impacts to the river and may be opposed by the State and/or Pyramid Lake Paiute Tribe. Does not address other flows from the hydrobasin that contribute to the lake. | This process could take multiple years to complete. | Long Term | Potential | (NDEP) Nevada Department of Environmental Protection; (NDOW) Nevada Department of Wildlife | (FS) Forest Service (property owner) | Yes |
| Reno Sparks Indian Colony use of water | The Reno Sparks Indian Colony representatives have discussed the potential to utilize water from Swan Lake and Wastewater Treatment facilities on their property in Hungry Valley. | Potential long term use of treated effluent. | Early stages of discussion related to use. Unsure if adequate supply of stormwater exists. Not sure about the amount of water necessary or exactly where the use would occur. | This process could take multiple years to complete. | Long Term | Potential | (NDEP) Nevada Department of Environmental Protection; (NDOW) Nevada Department of Wildlife | Possible (BIA) Bureau of Indian Affairs | Yes |
| Reservoir - City of Reno West Side | Installation of a dam for retention of effluent. | Storage of water to alleviate rise in lake. | Project has been assessed for storage of effluent associated with the Reno/Stead Wastewater Treatment Plant. | This process could take multiple years to complete. | Long Term | Potential | (NDEP) Nevada Department of Environmental Protection; (NDOW) Nevada Department of Wildlife; Nevada Division of Dam Safety | (BLM) Bureau of Land Management | Yes |
| Reservoir - East Side | Installation of an approximate 90' tall dam for storage of approximately 2,800 acre feet of water. | Storage of water to alleviate rise in lake. Could lower the lake level by approximately 2' - 3'. | There are many unknowns due to the early stages of review related to long term potential. | This process could take 12 months to complete. | Long Term | Potential | (NDEP) Nevada Department of Environmental Protection; (NDOW) Nevada Department of Wildlife; Nevada Division of Dam Safety | (BLM) Bureau of Land Management | Yes |
| Infiltration Basins | Creation of rapid infiltration basins to accept water pumped from the lake. | Removes water to allow reduction of lake elevation. | Unknown at this time how quickly the water can be infiltrated, and whether the water would infiltrate below the clay layer and not end up back in Swan Lake. | This process could take 12 months to complete. | Long Term | Potential | (NDEP) Nevada Department of Environmental Protection; (NDOW) Nevada Department of Wildlife | N/A | Yes |