FRIENDS of GREAT SALT LAKE

150 South 600 East, Suite 5D • Salt Lake City, UT 84102 • (801) 583-5593 • www.fogsl.org

June 2, 2022

Leah M. Fisher
Regional Permit Specialist
US Army Corps of Engineers, Sacramento District
Leah.M.Fisher@USACE.army.mil

Re: Comments Regarding Utah Lake Restoration Project (SPK 2018-00503)

Ms. Fisher:

Thank you for the opportunity to comment on the Utah Lake Restoration Project. Below is a point-by-point list of concerns that FRIENDS of Great Salt Lake has with the proposal presented to the US Army Corps of Engineers (USACE) by Lake Restoration Solutions (LRS). The numbering for the comments uses the section numbering from LRS' application to the USACE.

- *1. The Utah Lake Restoration Project (ULRP or Project) proposes to comprehensively restore and enhance Utah Lake.*
    - **Comment:** The project is not a "restoration." The USACE states that the intent of restoration is "to partially or fully reestablish the attributes of a natural, functioning, and self-regulating system." The Project instead seeks to create an unnatural, deeper lake that is not functional or self-regulating. A deeper lake with islands and causeways would require constant water pumping to improve water circulation and aeration systems to combat anoxic deep water. The Project is meant for development under the guise of restoration.
- *1. The Project includes dredging the majority of the lake bottom to remove nutrient-loaded sediment, replacing invasive plant and animal species with native species, and enhancing water quality to a cleaner and more natural state.*
    - **Comment:** The application provides no data on the extent or magnitude of "nutrient-loaded" sediment and ignores existing published datasets. The application provides no justification for dredging a "majority of the lake bottom." Further, the portions of the lake with the highest nutrient concentrations (Provo Bay) are excluded from dredging plans. The application does not provide any details about how the Project would replace invasive plant and animal species with native species or enhance water quality.

- *2.1. The basic Project purpose is to comprehensively restore and enhance Utah Lake, including dredge as needed, to recover the lake's ecosystem…*
    - **Comment:** There is no evidence that dredging is needed to restore the lake ecosystem. Rather, the scientific literature is full of case studies where dredging harms ecosystems by destroying lakebed and releasing toxins from sediment. If the intent is the "dredge as needed," there is no justification for dredging 90% of the lakebed.
- *2.1 As a result of these activities, the Project has been deemed a water-dependent enhancement project.*
    - **Comment:** The Purpose statement is flawed because it tries to describe the project as having both restoration and enhancement components. However, development is clearly the motivation for the Project.
- *2.2 The state of Utah has begun pilot programs for restoration of various aspects of Utah Lake, including removing invasive common reed (Phragmites australis), removing non-native carp, restoring the native June sucker (Chasmistes liorus), and other efforts, to improve water quality through partnerships between the Utah Department of Natural Resources (UDNR), including the Utah Division of Forestry Fire and State Lands (FFSL)…and Utah Division of Water Quality (DWQ).*
    - **Comment:** The application dismisses the past two decades of restoration work by state and federal agencies as "pilot projects." In reality, the lake is dramatically improving with the ongoing restoration work. The FFSL removed 70% of *Phragmites* by 2020 and reported reestablished native vegetation in 2021. The multi-agency (state and federal) June Sucker Recovery Implementation Recovery Program has reported a 78% reduction in non-native carp since 2012 through their carp removal project. The June sucker was downlisted from endangered to threatened in 2021. To improve June sucker spawning habitat, the Hobble Creek delta was restored in 2008 and the Provo River delta restoration will be completed soon. The DWQ is sponsoring the Utah Lake Water Quality Study to identify water quality conditions for a healthy lake and develop a strategy to achieve desired conditions. A 10-member science panel and 16-member community steering committee has been working since 2018 to better understand the lake ecosystem and fill knowledge gaps. The recommendations of the study are expected within the next two years.
- *2.2 Despite significant efforts, Utah Lake continues to degrade. Without significant and comprehensive restoration and enhancement efforts, the future of Utah Lake, its plants, animal species, and use of the lake by residents of the state of Utah remains uncertain.*
    - **Comment:** The Project is based on the false premise that the lake is unusable, getting worse, and the only way to save it is by dredging the entire lakebed. The application provides no evidence that the lake condition is getting worse. Instead, the application acknowledges in section 3.1.4.2.1 that "ongoing concerted carp removal efforts in Utah Lake have improved overall aquatic ecosystem health."

- *2.2 …development of some of the containment areas to fund the restoration and enhancement activities.*
    - **Comment:** The application downplays the amount of development that will take place on the islands. Table 28 of the application shows that development is the primary intended use of 89% of the island acreage.
- *3.1.4.2.1 Utah Lake functions as a shallow, freshwater lake ecosystem with the potential for two alternative stable ecological functions: a clear water state or a turbid water state…However, several ecological disturbances have led to a reduction of aquatic vegetation, thereby changing the lake from a complex clear water system to a simplified turbid system with poor water quality.*
    - **Comment:** The application provides no evidence that Utah Lake was ever a clear water system. It has most likely always been turbid because of natural calcium carbonate precipitation in the water column, natural sediment resuspension from wind and fish, and naturally abundant nutrients in the water column. The application acknowledges the natural turbidity in section 3.9.3 "Utah Lake is a highly turbid lake, due in part to resuspension of bottom sediments (a result of wind action and fish feeding) and the precipitation of calcium carbonate ($CaCO_3$) and other minerals from the water column. Nutrient loading is recognized as an issue contributing to the eutrophication of Utah Lake." Again, the application acknowledges this in section 3.9.4.3.2 "Turbidity in Utah Lake is naturally elevated due to the precipitation of calcium compounds from calcite adsorption. Additionally, frequent windy conditions cause resuspension of fine benthic sediments, which can dramatically increase turbidity." Aquatic vegetation was likely found on the fringes of the lake but not in the main body of the lake. Aquatic vegetation on the shoreline would not prevent sediment resuspension in the main lake.
    - **Comment:** There is also evidence that clear lake conditions would cause worse algal blooms, as acknowledged in section 3.9.4.3.2 "turbidity is recognized as a factor that may limit primary production in Utah Lake."
- *3.3.7 Table 11*
    - **Comment:** The aesthetic concerns from multiple viewing angles is arbitrarily defined as "moderate" at Vineyard Beach, Utah Lake State Park, and Squaw Peak mountain trail. In reality, the islands would create a high visual impact from these locations, particularly from designated wilderness areas and other Forest Service land in the Wasatch Mountains.
- *3.7.3.1 Figure 10*
    - **Comment:** The figure shows normal faults on the lakebed of Utah Lake but these faults are not discussed in relation to construction of islands. Active faults on the lakebed would create an unstable foundation for island construction and development.

- *3.7.3.3 Sources of inflow to the lake include surface water tributaries, precipitation falling on the lake, lake-bottom springs, and groundwater inflow.*
    - **Comment:** The application does not describe loss of inflow from precipitation with 18,000 acres of islands covering the open lake. The lake bottom springs would create an unstable foundation for island construction and development.
- *3.7.6.3 The potential for fault ground rupture or cracking within the area of analysis is considered high and would require the consideration of mitigation measures to avoid or reduce impacts from the Project.*
    - **Comment:** The application should include more details about how these impacts would be reduced.
- *3.7.6.4 The Project…will likely experience moderate to severe ground shaking in response to a large-magnitude earthquake occurring on potential local faults within the area of analysis or more distant active faults during the expected lifespan of the Project…The potential for significant seismically induced ground shaking in response to an earthquake occurring along the identified faults beneath Utah Lake, the Wasatch Fault Zone, or other regional faults is relatively high.*
    - **Comment:** The application should provide details on how the Project will mitigate for seismic activity. There is a substantial public safety risk putting hundreds of thousands of people on islands in a seismic zone. There should be some discussion of liability for harm caused by the development.
- *3.7.6.6 If it is found that liquefaction susceptibility needs to be reduced, then the soil can be improved…*
    - **Comment:** Liquefaction susceptibility certainly needs to be reduced and the application should include a detailed plan for how this will be done and how much it will cost. The soils around Utah Lake have a high liquefaction potential. The lakebed sediments also have high liquefaction potential. Section 3.7.6.3 acknowledges that "seismic profiles identified evidence of basin-wide liquefaction of the lakebed to a depth of approximately 2 m and probably evidence of seismically triggered debris flow." It seems highly unlikely that liquefaction risk can be reduced sufficiently to allow for development on the islands.
- *3.9.3 The shallow nature of the lake…minimizes thermal stratification in the water column.*
    - **Comment:** One of the main problems of dredging the lake to make it deeper is that thermal stratification will develop in the deep areas, resulting in anoxic water and related water quality problems.
- *3.9.3.2 The lake receives nutrient inputs…from internal sources such as nutrient cycling from the benthic sediments.*
    - **Comment:** Nutrient cycling from sediments is not considered a source of nutrients because the nutrients are already in the system. Rather, sediment cycling is considered a nutrient flux that can be remediated by decreasing external nutrient loading.

- *3.9.3.2.2 Nonpoint sources*
    - **Comment:** The Project will not be able to control nonpoint nutrient sources such as stormwater and atmospheric deposition, which could potentially cause eutrophic conditions even if other sources are controlled.
- *3.9.4.1 UDWQ classifies a water body as either mixed or stratified based on depth profiles. Utah Lake is considered a mixed water body and, therefore, was assessed by UDWQ using the protocol for mixed lakes.*
    - **Comment:** After dredging, the lake will be stratified in the deepest areas, changing the way the lake is classified and regulated.
- *3.9.4.2 There is an abundance of public water quality data on Utah Lake and the surrounding area over the last several years. In 2017, UDWQ created a monitoring plan to focus efforts on tributary monitoring around Utah Lake to better quantify inflows and pollutant loading…*
    - **Comment:** These efforts are bearing fruit with the Utah Lake Water Quality Study. The proposed Project is unnecessary because water quality is already improving without dredging.
- *3.9.4.3.1 DO is necessary for a healthy aquatic ecosystem and can significantly impact other water quality parameters. The water in Utah Lake is generally well oxygenated, with DO concentrations ranging from 6 to 13 milligrams per liter (mg/L). This is largely due to several factors: the general well-mixed nature of the lake and lack of vertical stratification, primary production, and reaeration from wind disturbance.*
    - **Comment:** The Project will harm water quality in the Utah Lake by removing the very characteristics of the lake that allow it to be well oxygenated. With dredging and construction of islands and causeways, the lake will no longer be well-mixed and will develop vertical stratification in deep areas. Wind disturbance will be decreased so the lake will be less effectively reaerated. High levels of primary productivity often lead to low DO concentrations as oxygen is consumed by respiration during nighttime hours. The fact that the lake does not experience low DO at night suggests that primary productivity is within a desirable range to support aquatic life and fish.
- *3.9.4.3.2 Turbidity in Utah Lake is naturally elevated due to the precipitation of calcium compounds from calcite adsorption. Additionally, frequent windy conditions cause resuspension of fine benthic sediments, which can dramatically increase turbidity. While phytoplankton growth and HABs can further increase turbidity, turbidity is recognized as a factor that may limit primary productivity in Utah Lake.*
    - **Comment:** The Project will not be able to create clear water conditions because the lake is naturally turbid. Besides, clear water conditions may be detrimental to the lake ecosystem by creating worse harmful algal blooms.
- *3.9.4.3.4 The highest concentrations of chlorophyll a are found in Provo Bay, with some measurements up to 400 micrograms per liter.*
    - **Comment:** The Project claims to be a restoration project to create clear water conditions in Utah Lake. However, the Project is completely avoiding Provo Bay,

which has the highest algae concentrations. Provo Bay will continue to have elevated chlorophyll *a* after completion of the Project. Algae produced in Provo Bay will be pushed into the main lake during wind events, where they will continually affect water quality.

- *3.9.4.3.4 HABs have occurred in Utah Lake since at least the 1970s; however, there was no assessment method for HABs until 2015.*
    - **Comment:** There is plenty of evidence suggesting that HABs are improving over the past couple of decades in most parts of the lake.
- *3.9.4.3.5 Several factors contribute to eutrophication in Utah Lake, including land use in the Utah Lake Basin, sediment resuspension by carp, point and nonpoint pollution, atmospheric deposition of nutrients, and turbidity increase from wind action.*
    - **Comment:** In other parts of the application, the Project assumes that nutrient release from sediments is the primary nutrient problem but it is not even mentioned here in the introductory statement on nutrients. There is no plan to address these other nutrient sources. This is strong evidence that dredging would be ineffective at addressing nutrient issues because there are other uncontrolled nutrient sources besides sediment.
- *3.9.4.3.5 While Utah Lake's benthic sediments are a sink for phosphorus, under certain conditions they become a source of phosphorus to the water column, fueling primary production, including HABs.*
    - **Comment:** The relationship between sediment phosphorus release and HABs is not well established. HABs are probably more closely related to external nutrient inputs from tributaries, including wastewater treatment plants. The sediments are a net sink of over 90% of nutrients in the lake. The sediment scavenges phosphorus and only a small fraction is released to the water column. With a decrease in external nutrient sources, the amount of phosphorus recycling would correspondingly decrease over time.
- *3.9.5.3.1 The existing EFDC water circulation model was updated to better understand current conditions in the lake.*
    - **Comment:** The application is not transparent about how the circulation model was updated. The Project should wait for the DWQ to calibrate the model and test assumptions with input from the Science Panel before using the models.
- *3.10.3.4 The net potential GHG emissions associated with proposed Project include the temporary increase in GHG emissions associated with construction activities as well as the long-term reduction in eutrophication-related GHG emissions associated with lake enhancement.*
    - **Comment:** There is no evidence for the claim that there would be a long-term reduction in GHG emissions due to lake enhancement. Contrarily, there would be a long-term increase in GHG emissions from new developments and traffic on the islands.

- *3.10.4.3 This stands to lend a large regional benefit to the GHG budget of the region by providing the most up-to-date and efficient means of productivity through all of these large-scale processes, therefore reducing the per-capita GHG for the entire Wasatch Front.*
    - **Comment:** This statement cannot be evaluated because the application provides no information about the types of development that will take place on the islands. In direct contradiction to this statement about improvements in GHG emissions due to the Project, section 3.10.3.2 claims that the Project "does not include specific requirements or restrictions regulating factors such as the number of cars or businesses allowed after construction" and that "emissions specific to the Project cannot be quantified." Even if there is a per-capita improvement in GHG emissions, there would still be a net increase in GHG emissions from the new development.
- *3.10.4.3 Further, with the anticipated enhancement of Utah Lake to a vibrant natural ecosystem, this will result in a massive decrease in atmospheric methane, as Utah Lake will no longer be a 96,000-acre producer of methane from current extensive eutrophic algal blooms.*
    - **Comment:** This is completely speculative as no studies have measured methane or other GHG emissions from Utah Lake. Further, algal blooms never cover the entire 96,000-acre lake surface so the methane emissions (if they exist) are overstated.
- *3.11.4.2 The sources of noise related to the Project are anticipated to include in-water dredgers, a variety of heavy equipment at some locations on the shoreline…, trucks…"*
    - **Comment:** The application includes no discussion of how long the noise disruption will last or the extent of the disruption. In their proposal to the state of Utah, LRS estimates that dredging will require "a fleet of 55-60 dredgers working 20 hours a day, 6 days per week" to complete all dredging within 8 years and that construction on the islands would last 25 years.
- *4 The dredge depths will vary and could range from 3 feet to 35 feet…with an average increased depth of 7 feet.*
    - **Comment:** The depth of dredging is not in alignment with removing "contaminated" sediments for remediation or restoration work. Recent sediment coring studies suggest that sediments with relatively high phosphorus concentrations make up the top 1 to 2 feet of sediment.
- *4 The dredging will remove nutrient loaded sediment from the lake bottom and place it in containment areas for the beneficial uses of sequestering phosphorus, nitrogen, TDS, and other constituents out of the lakebed and water column.*
    - **Comment:** The application provides no evidence that the sediment is "nutrient loaded" and does not even cite existing published studies that show sediment phosphorus concentrations across the entire lakebed. If the top sediment is removed by dredging, the underlying sediment still contains naturally high phosphorus concentrations. Coring studies show that the sediment contains naturally elevated concentrations of phosphorus that has accumulated in the lake

from erosion of phosphorus-rich rocks in the watershed, with some cores showing a moderate increase in phosphorus in recent (top) sediments. Further, if removing contaminated sediments is truly the goal, the Project should focus on Provo Bay, which has the highest sediment nutrient concentrations. Instead, the Project will dredge the entire lakebed except Provo Bay.

- *4.1 Additionally, the containment areas will reduce the surface area of the lake by approximately 20% to reduce evaporation and conserve water to increase water supply for the state.*
    - **Comment:** The application does not account for consumptive water use by the new island developments. Any water savings accrued by the Project will likely be claimed by the new developments, resulting in zero net increase in water supply for the state.
- *4.1 Table 28*
    - **Comment:** The application states that development islands provide the funding mechanism for the Project, but it is not clear why 89% of the islands are designated for development. There should be a cost analysis showing that such a high proportion of development islands is necessary to fund the Project. If the cost analysis shows that 89% development is excessive, then the development acreage should decrease accordingly.
- *5.3 A proposed tie-in in the Vineyard area is approximately 545 acres in size.*
    - **Comment:** The proposed Vineyard tie-in would connect to 400 S, which passes by Vineyard Elementary School and Lakeside Park. The road is already subject to excessive traffic congestion and would not sustain additional highway lanes to connect with the islands.
- *5.4.1 It should be noted that the sediments are believed to contain elevated nutrients that contribute to the ongoing water quality concerns.*
    - **Comment:** The entire Project is based on the premise that the sediments are "believed" to contain elevated nutrients. The application provides no data to support this claim and even ignores existing published studies that show nutrient concentrations in sediment. Further, the link between sediment nutrients and "water quality concerns" is speculative.
- *5.4.1 Data from sediment samples collected by others suggests that the dredge material is suitable for beneficial reuse.*
    - **Comment:** The application should provide a citation for data from other sources.
- *5.4.2 The Project will result in temporary, localized increased turbidity within the Project area resulting from dredging operations.*
    - **Comment:** The application downplays the effects of dredging on lake turbidity. LRS estimates that dredging would take place over eight years, which is certainly more than a "temporary" effect. A fleet of 55-60 dredgers would create a lake-wide increase in turbidity.

- *5.4.3 The Project will cause a temporary short-term, localized disturbance of water quality resulting from dredging operations.*
    - **Comment:** The application downplays the effects of dredging on water quality in the lake. LRS estimates that dredging would take place over eight years, which is certainly more than a "temporary" or "short-term" effect. A fleet of 55-60 dredgers would create a lake-wide disturbance of water quality.
- *5.4.3 Following the initial disturbance, the Project is expected to have long-term positive effects on water quality within Utah Lake.*
    - **Comment:** There is a high likelihood that water quality will be worse due to circulation problems, stratification, and pollution from the development islands and roads.
- *5.4.4 Project activities are expected to improve the normal current patterns and water circulation of Utah Lake.*
    - **Comment:** The islands and causeways will certainly not improve normal water current patterns or water circulation in the lake. Instead, these will impede natural currents and created areas with greatly decreased water circulation. To improve water circulation both laterally and with depth, the LRS application to the state describes installing a series of pumps and aeration systems. Rather than functioning as a natural system with wind-driven circulation patterns, the lake would be completely dependent on human intervention to provide water circulation.
- *5.4.6 The Project will have no effect on salinity gradients.*
    - **Comment:** As observed in other brackish or salt lakes, there is a good chance that salinity zones would develop spatially with lack of water circulation and vertical salinity gradients would develop with thermal stratification.
- *5.4.7 Project impacts to threatened and endangered species are unlikely.*
    - **Comment:** The endemic June sucker has evolved over thousands of years to survive in a shallow lake. A deeper lake would likely negatively impact the June sucker. It is reckless to alter the June sucker habitat just as the species is beginning to recover (and was recently downlisted from endangered to threatened).
- *5.4.8 Project activities will temporarily disrupt life cycle movements of aquatic life indigenous to Utah Lake.*
    - **Comment:** The application downplays the effects of dredging on life cycle movements of aquatic life. LRS estimates that dredging would take place over eight years, which is certainly more than a "temporary" effect. A fleet of 55-60 dredgers would create a lake-wide disruption to aquatic life.
- *5.4.18 The containment areas may potentially impact the aesthetics of Utah Lake and from multiple viewpoints.*
    - **Comment:** The containment areas will be a permanent eyesore from every viewpoint on the lake, the lakeshore, Utah Valley, and the Wasatch Mountains.

- *5.4.22 The Project includes dredging an estimated 957,710,915 cubic yards of nutrient-loaded sediments from the lakebed…*
    - **Comment:** The application provides no evidence that such a large volume of sediments is nutrient-loaded. Best management practices would involve targeted dredging of contaminated sediments in isolated areas rather than wholesale dredging of the entire lakebed to depths that are far beyond what is potentially impacted by human pollution.
- *5.5.13 The Project will have positive effects on navigation resulting from the deepening of the lake and reduction of the severity of wave actions.*
    - **Comments:** The Project will also have negative effects on navigation resulting from causeways and islands in the lake.
- *5.6.2 Improve water quality in Utah Lake by removing nutrient-loaded sediments and reducing turbidity in the lake.*
    - **Comment:** Notably missing from the list of mitigation measures is wastewater treatment facility upgrades, stormwater capture and treatment, and biofiltration and aeration systems. These are very expensive upgrades that were promised by LRS in their proposal to the state but are not included in the application. The Project would not achieve its goals without treating external nutrient sources.
- *5.6.2 Remove invasive plant and animal species, including Phragmites and carp, from Utah Lake.*
    - **Comment:** There is no plan for how this would be accomplished and to what extent invasive species would be removed. It would be impossible to completely remove invasive species from the entire lake.
- *5.6.2 Control dredging production rates maintain historic lake levels during dredging operations.*
    - **Comment:** Lake levels have fluctuated by several feet historically. This is a very large moving target. The application should define the lake level that will be maintained during dredging.
- *5.6.2 Provide archeological and biological monitors*
    - **Comment:** The Project should also provide water monitors during construction to avoid impacts on water quality.
- *6 Alternative Analysis*
    - **Comment:** There are hundreds of ways to improve Utah Lake without dredging and building islands. The ongoing Utah Lake Water Quality Study (ULWQS) is a comprehensive study aimed at improving the lake ecosystem. The study started in 2018 and will be completed in 2024. Dredging should not be considered as mitigation for Utah Lake until the ULWQS is able to implement its findings and sufficient time has passed for the lake to reach a new stable state.
- *Appendix D Project map*
    - **Comment:** Several of the development islands (D2, D3, D4, D6, D8, D9, D16, D17) have no road access. The number of roads and causeways would certainly be greater than what is described in the application. Further, several islands are not labeled and are likely not included in the acreage estimates.

Again, thank you for the opportunity to provide comments on LRS' application. Please feel free to contact me with any questions you might have regarding these comments.

Sincerely,

Rob Dubuc
General Counsel
150 South 600 East, Suite 5D
Salt Lake City, Utah 84102
(801)583-5593
robd@xmission.com