Utah Lake island application lacks restoration plan and fails to demonstrate benefits or need

Details about the proposal to build islands across Utah Lake have come to light through the public release of the permit application to the US Army Corp of Engineers (link here). Unfortunately, the application deepens concerns about the dangers of this project and reinforces doubts that it would or could be completed safely.

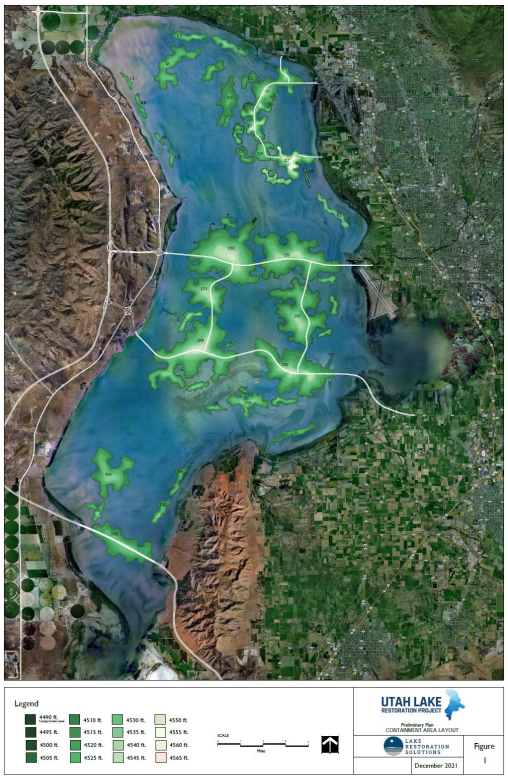

Figure 1. Project design from Lake Restoration Solutions' dredging application.

The company Lake Restoration Solutions (LRS) is proposing the world's largest dredging and island-building project (Fig. 1). Though the application does not specify a timeline, LRS has previously estimated 15 to 30 years of near-constant dredging and construction in and around the lake. This would radically transform views and disrupt traffic patterns for the entire region. It would also destroy 95% of the lakebed and permanently alter the lake's hydrology, chemistry, and biology. These actions would almost certainly erase decades of restoration[1–5] and render Utah Lake permanently dependent on costly human interventions, some of which are acknowledged in the application.

While LRS has assured the public that this application would prove the scientific and engineering merits of their proposal, these documents instead demonstrate a profound lack of understanding of the Utah Lake system, a nearly absent restoration plan, and wholly inadequate precautions to prevent permanent damage to Utah Valley and the lake at its heart. LRS's primary justification for their unprecedented interventions is a claim that *"the sediments are believed to contain elevated nutrients that contribute to the ongoing water quality concerns."* LRS provides no evidence for this belief, which is in fact disproven by multiple independent studies. Utah Lake's sediments contain natural levels of nutrients except for limited areas directly impacted by wastewater treatment plants[6–9]. This means that invasive and costly dredging would provide no environmental benefit while causing massive habitat destruction, water quality degradation, permanent loss of the lake's resilience, and decades of missed restoration and recreation potential. The consequences of these changes could negatively affect downstream water rights and damage efforts to save the Great Salt Lake and restore the Pacific Flyway.

Widespread deficiencies in the application also raise questions about the intentions of LRS. Some of the most important sections are left undone, underdone, or are plagiarized from government documents and other companies' applications. For example, LRS utterly fails to demonstrate need for the project and provides no analysis of alternative ways to meet their goals—two of the basic requirements for a dredging permit of this type (EPA description here). LRS admits that they have not yet developed a plan for restoring the lake but claims that such work will be done in future stages, including after the beginning of dredging. The few "restoration" measures that are vaguely described bear no resemblance to proven practices in lake restoration or conservation[10–15].

In summary, LRS provides no confidence they will achieve the restoration criteria required by the Utah Lake Restoration Act or protect Utahns from the enormous infrastructure, environmental, and economic risks imposed by their attempt. We provide more detail about our concerns in the pages below. We call on policymakers, managers, and citizens of Utah to carefully evaluate what is being proposed and act with the utmost caution and discernment. Sustaining the ongoing recovery of the Utah Lake system depends on rigorous research, conservative management, and public engagement.

Thank you for considering these concerns and taking action to ensure a vibrant Utah Valley for future generations,

Sam Rushforth[1], Russell Rader[2], Greg Carling[2], Josh LeMonte[2], Erin Jones[2], Michael Searcy[2], Nathan Thompson[2], Derrek Wilson[2], Sam Bratsman[2], Karin Kettenring[3], Janice Brahney[3], Michael T. Stevens[1], Jes Braun[3], Byron Adams[2], Isabella M. Errigo[2], Rachel Buck[2], Heidi Wilding[2], Jani Radebaugh[2], Lafe Conner[4], Tara B. B. Bishop[4], James Westwater[5], Linda Mooney[6], James 'Flaming Eagle' Mooney[7], Ryan Stewart[2], Sam St. Clair[2], Ben Abbott[2], and Richard Gill[2]

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Utah Lake background

Utah Lake is the largest freshwater lake in the state and a keystone ecosystem in western North America (detail here). As a part of the Great Salt Lake watershed and the Pacific Migratory Bird Flyway, Utah Lake supports tens of millions of birds, fish, and other wildlife[5]. The lake provides invaluable ecosystem services, including regulation of local climate, water storage, recreation, protection of air quality, nutrient removal, enhancement of property values, scenic views, and cultural and historical significance[16–18]. Like most waterbodies in the U.S. and globally, Utah Lake experiences occasional algal blooms associated with human nutrient inputs[19,20]. Because of its natural characteristics as a shallow, well-mixed, and somewhat cloudy lake, Utah Lake has been more resilient to human nutrients than other water bodies. For example, it was recently classified in the lowest category nationally for algal bloom frequency—cleaner than most lakes and reservoirs in Utah[19]. After experiencing a drying event and a trophic shift in the 1900s, decades of restoration and conservation efforts have reduced nutrient inputs to Utah lake, increased river flow, and controlled invasive species. These innovative and sustained efforts have resulted in recovery of native species, decreasing algal blooms, and increasing water clarity over the past 35 years[3,4,21]. Ambitious restoration projects are protecting habitat and improving public access, including the Provo River, Hobble Creek, Powell Slough, Utah Lake Wetland Preserve, and marinas and other areas around the lake[5].

Overview of proposed LRS activities

The LRS proposal submitted to the Army Corps describes four main activities: 1) dredging the lakebed, 2) constructing islands, 3) expanding wetlands, and 4) building infrastructure. LRS claims that these activities are needed because *"the sediments are believed to contain elevated nutrients that contribute to the ongoing water quality concerns."* LRS provides no references or new data to support this claim, which is directly contradicted by multiple studies showing natural concentrations of nutrients for most of the lakebed[6–9].

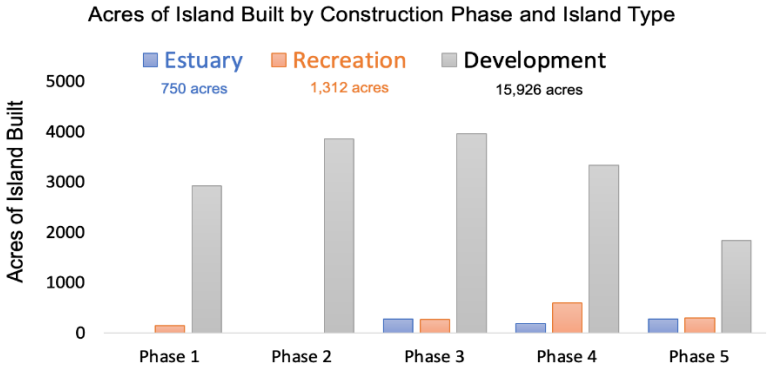

Figure 2. The size and timing of the three artificial island types described by Lake Restoration Solutions in their application. Overall, around 90% of the newly created area would be "development islands."

Despite no demonstration of need, LRS proposes to hydraulically and/or mechanically dredge 62,400 acres (73% of the lakebed) to increase depth by 3 to 35 feet. This would require removing approximately 1 billion cubic yards of sediment that would be formed into 34 islands totaling 18,000 acres (Fig. 1). This would make the LRS project approximately 30-times bigger than the world's largest nutrient dredging operation we know of (Lake Taihu, China)[1]. The dredged area plus the area covered by islands would leave only 5% of Utah Lake's natural lakebed intact. This is of immense concern because the lakebed is habitat to hundreds of thousands of tons of filter feeding invertebrates (insects and bivalves) and microorganisms that support the lake's food web and detoxification of pollutants[22]. While the application does not specify the duration of dredging, LRS's original proposal estimated that it would take *"60 dredgers working 20 hours a day, six days a week, for eight years to move this quantity of material."* The current application downplays this disruption by suggesting that dredging *"will cause a temporary short-term, localized disturbance of water quality."*

Of the 18,000 acres of artificial islands, 89% of the acreage is "development islands" designated for residential and commercial use, while 7% of the area is "recreation islands" for public use, and 4% is "estuary islands" reserved for wildlife habitat (Fig. 2). In the first two phases of the project, all but one of the islands is

designated for development, with estuary and recreation islands included in the later stages of development around the fringes of the lake.

LRS plans to sell approximately 8,800 acres of the development islands for commercial and residential development. Based on estimates from their fundraising documents not included in the application, these 8,800 acres of new land could be worth $3.5 to $5.7 billion as undeveloped real estate, not considering the other land on the development islands that could be sold to the state or future municipalities. To access the islands, LRS proposes to build 9.5 miles of causeways, bridges, and elevated roadways across the lake, including 5.7 miles of eight-lane roadways (Fig. 1).

Societal risks from proposed activities

The application brings up a partial list of serious risks associated with the creation and development of artificial islands of such unprecedented size in such a unique context. Risks include earthquakes, liquefaction, decreased water circulation, impacts from hot springs in the lakebed, destruction of archeological sites around and within the lake, aesthetic damage to the valley, increased traffic, disruption of migratory birds, noise pollution, air pollution, light pollution, disruption of boating, road hazards, polluted runoff from islands and roads, temporary or permanent destruction of critical habitat, and risks of tsunami and seiche waves in and around the lake (Fig. 3)[23]. LRS provides no convincing solutions to most of these problems, often stating only generic claims that protective measures and precautions will be developed in the future, in some cases after they have already begun dredging. The lack of precaution is wholly unacceptable given the public health stakes of creating an island city, the ecological importance of Utah Lake, and the rich and sensitive archeological history of this region. To that final point, human habitation extends back millennia around Utah Lake, including below the current water line. For example, the 5,000-year-old Mosida Burial occurs near the proposed causeway crossing Goshen Bay[24], and countless sites are likely present in areas where dredging or island creation would occur.

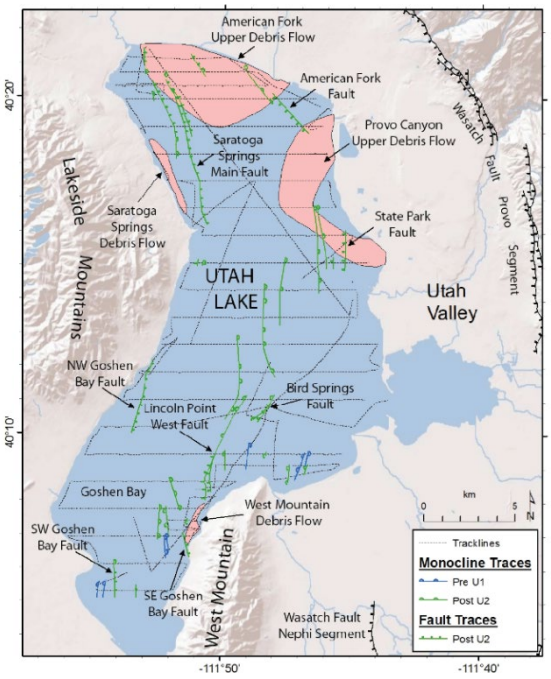

Figure 3. Seismic faults and debris flow deposits in Utah Lake (Dinter 2014).

Potential environmental impacts

While LRS claims the project is motivated by restoration, the details of how the project would actually benefit the environment are not included in the current application. The application states that *"LRS is developing an Aquatic Species Restoration Plan and an Invasive Species Management Plan,"* that the *"Conservation Plan will be developed,"* and that *"conservation measures will be developed and implemented during the dredging."* Likewise, the *"Alternatives Analysis"* required by the National Environmental Policy Act has not yet been started. That analysis will evaluate if the project goals could be better achieved through less destructive and damaging interventions, including a "no-action alternative." While it is common for some details to be finalized during the environmental impact statement stage of a proposal, we are aware of no projects of this size that have had such an undeveloped restoration and mitigation plan at the time of application.

The described activities in the application and LRS's behavior so far bear no resemblance to current best practices in restoration of large eutrophic lakes and other waterbodies[10,11]. While legitimate restoration begins with careful study of the ecosystem and transparent collaboration with the local community[25–28], LRS's proposal appears to be a funding mechanism in search of a problem. Not only would the described activities

fail to improve the ecological status of Utah Lake, but they would likely cause irreparable damage to the lake and surrounding area. Some of the proposed modifications and potential harms include:

1. Deepening and dividing the lake would reduce water column mixing and exacerbate the consequences of algal blooms, including hypoxic dead zones, pollutant release from sediment, and fish kills[29–32].
2. Loss of natural evaporation would decrease local humidity and precipitation, increase flood risk during high water years, and reduce the lake's pollution removal capacity by decreasing formation of calcite[6,33,34].
3. Unprecedented freshwater dredging would decimate the lakebed biodiversity, potentially reduce pollutant removal, and release pollutants that are currently safely immobilized by the lakebed[22,35,36].
4. Artificially increasing light penetration could stimulate algal and cyanobacterial growth[37,38].
5. Roads, buildings, human habitation, and changes to bathymetry in the lake could disrupt migrating bird populations, harm recovering native species, and interfere with current recreational and water use of the lake.
6. Fundamental modifications to the lake's hydrology, chemistry, and food web could render Utah Lake permanently dependent on active human intervention by replacing the lake's natural resilience with costly technological substitutes such as the proposed water circulators and mechanical biofilters, easily costing $100 million per year or more[39].
7. Degradation of the Utah Lake ecosystem would affect downstream water users and negatively affect efforts to restore the Great Salt Lake, Jordan River, and Pacific Migratory Bird Flyway.

These and additional dangers associated with LRS's proposal threaten virtually every beneficial use Utah Lake currently provides. Some of these risks have been described in this letter of warning signed by 117 scientists, engineers, natural resource managers, recreation managers, and environmental law experts in December 2021.

Additional scientific and technical issues with the application

LRS's president stated that this application would be *"replete with science, data, and all the research that we've been doing over the last couple of years,"* (January 2022, Utah Lake Summit). While the application does include a required wetlands survey, it does not present any new water or sediment chemistry data. Likewise, it provides no new evidence that the proposed modifications would be beneficial to Utah Lake in any way. Instead, LRS claims that they will perform this research later, in some cases after the beginning of dredging.

In addition to not presenting new data, LRS disregards many available studies about Utah Lake. The application cites a total of 12 peer-reviewed studies, only 4 of which were published since 1994. There have been dozens of recent publications on Utah Lake and hundreds on similar systems worldwide. Likewise, the application does not draw on available engineering reports and data from previous surveys and attempts to build dikes and causeways on Utah Lake. The disregard of this information—whether intentional or unintentional—is not reassuring from a group that claims to be capable of reengineering the lake from the bottom up. The content of the application contrasts sharply with LRS's portrayal; for example the claim that their proposal contained *"over 100 pages of citations to peer-reviewed science"* and their statements implying that thousands of environmental scientists are working on their project (Jeff Hartley, January 11, 2022).

Just as serious as the omissions, the research that is cited is often misunderstood, misconstrued, or misrepresented. For example, LRS cherry picks evaporation and wastewater location data from two studies[7,9] but fails to mention the primary findings of those studies: that most of the sediments in Utah Lake contain natural nutrient levels. While LRS must have been aware of this information—assuming they read and understood those studies—they continue to falsely claim that dredging the entire lake and building islands would somehow be beneficial to the lake's ecology.

There are other irregularities in the application that raise major questions about the seriousness and competence of LRS. For example, we found over 15 instances of major plagiarism, with whole sentences and paragraphs lifted from agency reports, websites, and other applications to the Army Corps. Likewise, tools to assess various impacts are not applied or interpreted correctly, there are wild changes in the level of detail provided, and there are widespread grammatical errors.

Transparency and community engagement

One of the most troubling aspects of LRS's approach is the lack of transparency and community engagement. By their own account, LRS has spent *"years meeting with interested parties and government officials"* (Jon Benson, Jan. 2022). Indeed, since April of 2021, the application discloses 48 private *"Agency meetings"* with state and federal officials, but no public meetings or substantive stakeholder engagement. Notably, LRS has not met with the Utah Lake Science Panel, the independent group of national and international experts working to provide recommendations for the restoration of Utah Lake, nor have they initiated coordination with Native American Tribes as required by Section 106.

LRS's focus on political and financial influence rather than public engagement has created widespread confusion and alarm for communities surrounding the lake. The lack of public trust has affected Utah Valley so deeply that Utah Lake's largest lakeshore restoration and conservation project (Walkara Way) has indefinitely been put on hold until there are assurances that the LRS proposal will not interfere with the work (recent video from the project lead). More broadly, LRS's consistent portrayal of Utah Lake as a "broken ecosystem" in a "downward spiral" discourages visitation to Utah Lake, damages community reconnection with the ecosystem, and unfairly stokes discontent about ongoing restoration efforts. For example, their application incorrectly portrays past and ongoing restoration projects as inadequate *"pilot programs."* In reality, decades of innovative and collaborative restoration have made enormous progress in and around Utah Lake[17]. For example, restoration projects have reduced carp biomass by 75%, improved wastewater treatment, increased water flow in tributaries, and restored thousands of acres of habitat around and within the lake[5]. These effective and sustained projects have decreased algal blooms, improved water quality, and allowed for the recovery of native species, notably leading to the downlisting of the previously endangered June sucker. LRS claims without evidence that their lake development project will somehow be more effective than this science-based and community-supported restoration.

While LRS has repeatedly stated that they welcome public input and scrutiny, their actions demonstrate otherwise. LRS has sued one of their most prominent scientific critics for $3 million (coverage), falsely stated that public input on project design and goals was inappropriate before the initiation of the official NEPA process (coverage and video), wrongly claimed they were prohibited by law from releasing their data or application until after the Army Corps review (video), and failed to answer questions about economic liability (video). They have dismissed citizen concerns about the project as *"emotional"* (video) and described expert critiques as *"misinformation from a few with their own agendas"* (coverage).

Conclusion, recommendation, and unanswered questions

After carefully evaluating the materials in this application and observing LRS's public and private behavior, we conclude that this project would be an unmitigated disaster for Utah Valley and Utah Lake. We recommend that the Army Corps reject the proposal outright. We invite all city, county, state, and federal policymakers and decisionmakers to learn about and carefully evaluate this proposal, which we consider extremely reckless and dangerous to our community and lake. The continued recovery of Utah Lake depends on your thoughtful leadership. At this crucial and delicate moment, we need to support proven restoration methods, robust public participation, and clear accountability for all partners.

For those who may interact with LRS, here is a list of twenty questions that we feel have not yet been adequately answered:

1. What scientific evidence does LRS have to demonstrate the project will benefit the lake?
2. Why has the restoration plan not yet been developed in the Army Corps application?
3. Why doesn't the application mention that the lake sediments have natural levels of nutrients?
4. Do any independent science or management experts currently working on Utah Lake support the LRS proposal?
5. Why hasn't LRS met with the Utah Lake Science Panel, the independent group of national and international experts who have been compiling research on Utah Lake for years?
6. What is the expected lifetime of the islands? Who is responsible for maintaining the islands after their construction?
7. Who will be financially responsible if the project fails? Given that it is a multi-billion-dollar project, how will LRS protect the people of Utah from paying for half-built islands or unintended damage to the lake?
8. What role will LRS play in continuing maintenance of the islands and modified lake if the project moves forward?
9. How much would it cost to maintain the modified lake system after LRS's alterations? For example, what are the estimated annual costs of operating the water circulators and biofilters to counteract stratification and algal blooms created by deepening and dividing the lake?
10. Given that bedrock is ~10,000 feet below the surface and this region is seismically active, what engineering measures will be used to ensure the islands are stable against shaking and liquefaction?
11. What studies have been done to ensure that the islands will not sink continually into the soft sediments, which likely extend to a depth of around 1,000?
12. What do cities around the lake think about this project and what say should they have in design and implementation?
13. How will LRS provide services such as water and sewer for the new island city and ensure safety during earthquakes, fires, floods, or other hazards?
14. How will the project avoid destroying archeological sites that are within the current lake boundary (e.g., the many Native American sites created when lake levels were lower)?
15. When would the transfer of sovereign land occur? If the restoration must be complete before the transfer, how will the project remain profitable? What will happen if the transfer of sovereign lands is deemed unconstitutional?
16. How will this project affect growth in Utah Valley? Specifically, have agreements been made with cities and UTA to accommodate 200,000 to 500,000 residents commuting on causeways?
17. Why has LRS continued to show outdated project designs to community and state leaders that exclude the roadways described and shown in the USACE application?
18. Who are the investors behind this project and how secure are their commitments? What are their motivations for making this investment?
19. What were the ecological and economic consequences of the artificial islands in Dubai that LRS Chief Design Director Robert Scott designed and oversaw? How will LRS avoid similar problems in Utah Lake?
20. LRS investment documents state: "Importantly, Phase 1's outcome is not dependent on LRS's future phases." Does this mean LRS is considering selling land before completing "comprehensive restoration" of the entire lake as required by the Utah Lake Restoration Act (Utah Code 65A-15-101)?

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