

Charting a Path Towards an Enhanced Utah Lake

Executive Summary of the Utah Lake Study

Purpose and Context

Utah Lake is one of the largest freshwater lakes in the western United States and a vital ecological, recreational, and cultural resource. Despite decades of monitoring and management, the lake continues to face significant challenges, including poor water quality, invasive species, and degraded habitats.

In response to these challenges, the Utah Legislature passed Senate Bill (S.B.) 270, directing the Utah Division of Forestry, Fire and State Lands (FFSL) to develop actionable strategies to enhance the lake's condition (the S.B. 270 goals of the ULS are listed in Figure ES-1). A review of existing information was conducted to identify these information needs for further study. This Utah Lake Study (ULS) Report outlines a scientifically sound, legally defensible, and community-responsive path forward—one that enhances the lake's current state rather than attempting to restore a historical condition.

Current Condition versus Enhanced Condition

Today, Utah Lake is impacted by several stressors, including turbid water, invasive carp, limited native vegetation, and periodic harmful algal blooms (HABs). The future enhanced condition envisioned by the ULS (and illustrated on Figure ES-2) includes the following characteristics to counter the stressors:

- Clearer, cleaner water
- Reduced invasive species abundance
- Thriving native fish, vegetation, and bird populations
- Restored littoral zone and plant communities
- Expanded and improved recreational access and opportunities

Figure ES-2. Comparison of Utah Lake's Current (left) and Future Enhanced Conditions (right), the Utah Lake Study Goal

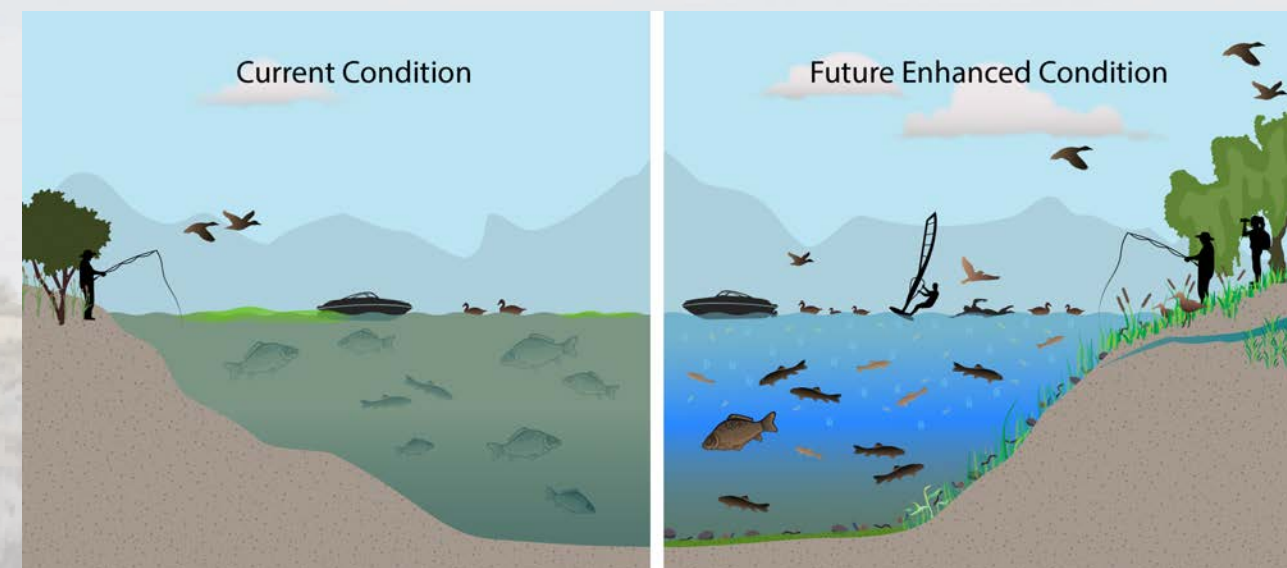


Figure ES-1. Utah Senate Bill 270 Benefit Area Goals for the Utah Lake Study

a. Improving the clarity and quality of the water in Utah Lake	b. Conserving water resources in and around Utah Lake
c. Removing invasive plant and animal species, including phragmites and carp, from Utah Lake	d. Restoring and improving littoral zone and other plant communities in and around Utah Lake
e. Restoring and conserving native fish and other aquatic species in Utah Lake, including Bonneville cutthroat trout and June sucker	f. Increasing the suitability of Utah Lake and its surrounding areas for shore birds, waterfowl, and other avian species
g. Maximizing, enhancing, and ensuring recreational access and opportunities on Utah Lake	h. Otherwise improving the use of Utah Lake for residents and visitors
i. Substantially accommodating an existing use on land in or around Utah Lake	j. Providing any other benefits identified by the division

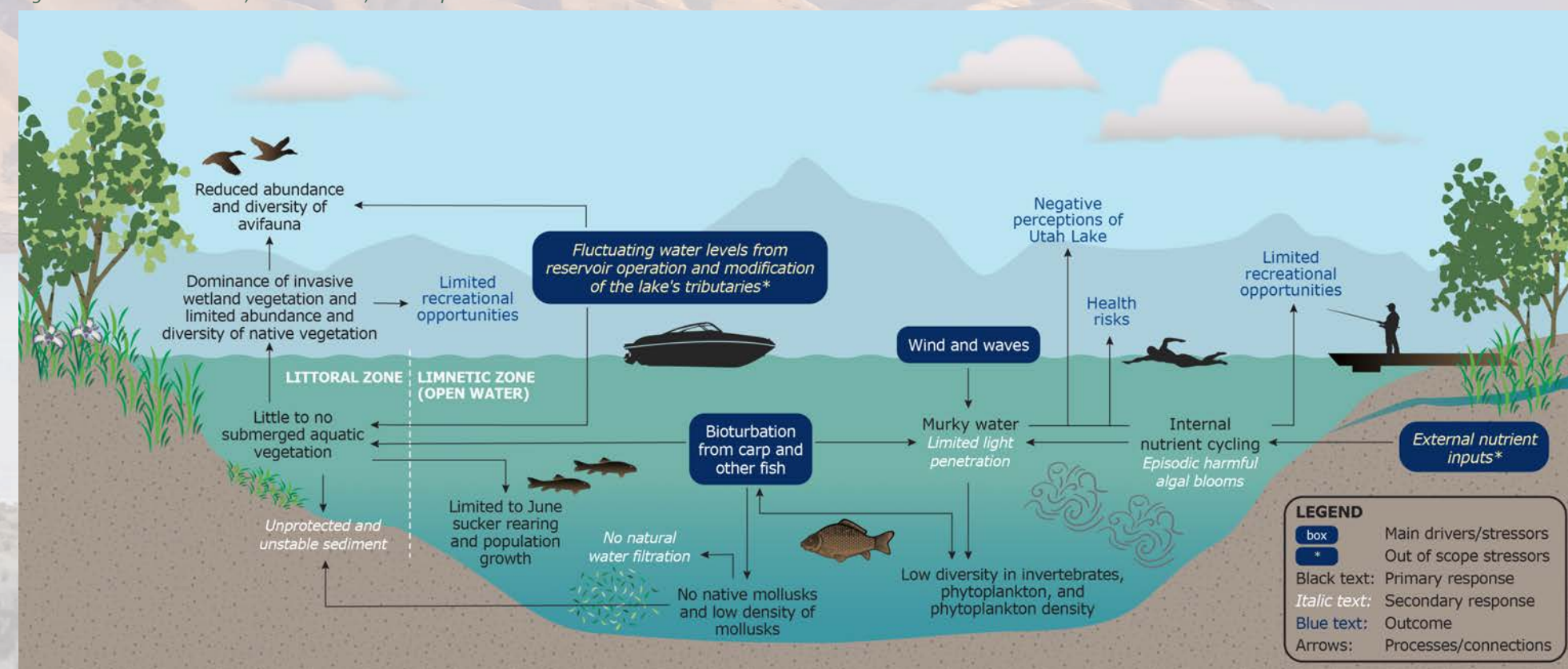
Key Findings

To improve the various interconnected benefits of the Utah Lake ecosystem as envisioned in S.B. 270, multiple stressors, including invasive carp, sediment resuspension and turbidity, elevated external nutrient inputs, and unnatural water level fluctuations, must be addressed in tandem through a coordinated, phased approach. No single solution can sufficiently meet the goal of the ULS, and successful recovery depends on managing all components in parallel.

The ULS addresses the stressors of invasive carp and sediment resuspension directly; nutrient inputs are addressed in the Utah Lake Water Quality Study (ULWQS; ULWQS Steering Committee and DEQ 2022). The ULS does not propose to modify existing water rights or interests related to water collection, storage, and delivery; instead the focus of the ULS is mitigating the effects of fluctuating water levels. Figure ES-3 provides a high-level overview of the ecological linkages between the various benefit areas and the following stressors that impact them, underscoring the need for enhancement efforts to address all ecosystem components. The benefit areas identified in S.B. 270 are influenced by the following primary stressors:

- **Invasive carp** bioturbation of sediments and subsequent degradation of aquatic habitats
- **Wind- and wave-driven sediment resuspension** resulting in elevated turbidity
- **Excessive nutrient inputs** (mainly nitrogen and phosphorus) from external sources
- **Significant and unnatural fluctuations in water levels** from lake management for water rights deliveries.

Figure ES-3. Main Stressors, Benefit Areas, and Responses of Utah Lake



The lake's ecosystem is complex, with interconnected processes affecting various S.B. 270 benefit areas.

Note: Utah Lake's ecosystem is complex, with interconnected processes affecting various S.B. 270 benefit areas. This illustration does not depict every detail of the lake's ecosystem or its complexity; rather, it shows the benefit areas to be enhanced under S.B. 270 and the main (high-level) processes that affect them.

Phased Enhancement Framework

The Phased Enhancement Framework (PEF) for Utah Lake (illustrated on Figure ES-4) is separated into two phases: Phase 1, short/mid-term (2026 through 2030), and Phase 2, mid/long-term (2030 through 2035). This PEF also uses four management tracks (detailed on Figure ES 5) to guide targeted actions by management agencies: invasive carp control, habitat enhancement and sediment management, nutrient management support, and human use enhancement.

This phased approach employing these four management tracks together provides a unified framework for lake recovery and management that allows managers to address the various stressors impacting Utah Lake simultaneously. This framework is flexible and can be adjusted based on changing conditions and results from completed and ongoing actions.

Phase 1: 2026 through 2030

Phase 1 is critical because it formalizes the long-term enhancement of Utah Lake by addressing key ecological stressors, especially invasive carp and habitat degradation, through targeted, science-based actions. This phase builds upon

existing knowledge, secures foundational funding, and establishes coordinated partnerships to ensure efficient implementation of enhancement strategies identified in this ULS Report. Figure ES-5 summarizes each of the four management tracks.

Phase 2: 2030 through 2035 Scaling Up

Phase 2 of the ULS PEF applies phased management principles, emphasizing learning through action. Rather than launching full-scale interventions immediately, enhancement strategies—such as carp removal, sediment stabilization, and habitat restoration—are first tested in pilot projects. These small-scale projects allow ecosystem responses to be closely monitored and techniques refined.

Once proven effective, these strategies are expanded into demonstration projects at a larger spatial scale and under more variable conditions. This step is critical for validating the scalability, cost-effectiveness, and ecological outcomes of Phase 1 actions. The iterative process minimizes risk, builds stakeholder confidence, and informs future decisions, ultimately guiding full-scale restoration across Utah Lake.

Figure ES-4. Overview of the Utah Lake Phased Enhancement Framework

Utah Lake Enhancement			Overall Goal
	Completed or Ongoing (2025)	Phase 1 (2026-2030)	
<div>Invasive Carp Control</div>	<div><ul style="list-style-type: none">Carp aging analysis to update population modelBaited trap pilot project to increase efficiency of carp removal efforts and inform IPM strategyLarge seine trials to increase carp removal efficiency and inform IPM strategyCarp movement monitoring to inform IPM strategy</div>	<div><ul style="list-style-type: none">Develop decision matrix for carp managementDevelop a lake-wide monitoring program to generate estimates of carp biomassExpand the use of emerging carp removal technologies such as box trapping, poison bait, removal of winter and summer aggregations, and seasonal barriers at spawning locationsDevelop a market for carpDevelop genetic tools to drive down the carp population</div>	<div><ul style="list-style-type: none">Accelerate carp removal by scaling up gear and automation to implement IPM strategy lake-wideFurther invest in and deploy genetic control technologies</div>
			<div>An enhanced Utah Lake with increased benthic primary production and less turbid water, which would result in the following benefits:<ul style="list-style-type: none">Reduced carp populationsEnhanced habitat for native speciesStabilized sedimentsImproved water quality and clarity</div>
<div>Habitat Enhancement and Sediment Management</div>	<div><ul style="list-style-type: none">Characterization of lake elevation data to inform revegetation strategiesDevelopment of a site suitability tool to inform revegetation effortsCompiled species lists for revegetationDevelopment of an initial scope for the Goose Point pilot projectDescription of the relationships between turbidity, light penetration, and SAV requirements to inform revegetation effortsNumeric modeling of wind and wave action to confirm suitability of Goose Point</div>	<div><ul style="list-style-type: none">Further develop Utah Lake Revegetation HandbookRefine site suitability modelsLaunch Goose Point pilot projectMonitor avian populations and habitat usePlan for scaling enhancement efforts using hydrodynamic modelingPilot engineering strategies to reduce sediment resuspension</div>	<div><ul style="list-style-type: none">Implement successful strategies on a larger or lake-wide scalePublish Utah Lake Revegetation HandbookDemonstrate engineering to reduce sediment resuspension</div>
<div>External Nutrient Management</div>	<div><ul style="list-style-type: none">Compilation of SAV habitat requirements to inform water clarity improvement needs</div>	<div><ul style="list-style-type: none">Align restoration goals with nutrient reduction targetsSupport DWQS numeric nutrient targets</div>	<div><ul style="list-style-type: none">Support the development of the ULWQS external nutrient management strategy</div>
<div>Human Use Enhancement</div>	<div><ul style="list-style-type: none">Supported the development of the ULA's Recreation Access Plan</div>	<div><ul style="list-style-type: none">Collaborate with ULA and partnersSupport efforts to upgrade recreational infrastructure, monitor visitation, and expand public safety programs</div>	<div><ul style="list-style-type: none">Collaborate with ULA and partners on ULMP and ULRAP implementationSupport efforts to upgrade recreational infrastructure, monitor visitation, and expand public safety programs</div>

Figure ES-5. Management Tracks for the Phased Enhancement Framework

Invasive Carp Control

Goal:
Reduce carp density to improve habitat and water clarity.

Estimated cost:
Additional DWR staff, approximately \$2.6 million (excluding overhead).

Habitat Enhancement and Sediment Management

Goal:
Restore littoral vegetation and stabilize sediments to improve water clarity and aquatic habitat quality.

Estimated cost:
Estimated \$2.15 – \$3.5 million for Goose Point Pilot Project (not including overhead).

External Nutrient Management

Goal:
Support DWQ's development and implementation of nutrient targets to reduce nutrient pollution.

Estimated cost:
To be determined be based on the ULWQS implementation strategy.

Human Use Enhancement

Goal:
Improve recreational access, safety, and public engagement.

Estimated cost:
To be determined based on the number and scale of recreation and access amenity upgrades.

Critical Success Factors

Successful ULS implementation will hinge on several critical success factors:

- Interagency coordination:** Effective Utah Lake enhancement will hinge on strong collaboration. While FFSL is tasked with leading the ULS under S.B. 270, its jurisdiction is limited to sovereign lands within the lake's settlement boundary. Many factors influencing lake health—such as water levels, watershed restoration, and land use—fall under the authority of other state agencies. FFSL must work closely with these partners to align efforts, respect existing water rights, and ensure that enhancement strategies are legally sound and efficiently implemented.
- Dedicated team capacity:** Successfully implementing the ULS PEF will require a skilled, multidisciplinary team from multiple state agencies to lead coordination, monitoring, and execution across agencies and stakeholders.

- Building this capacity will require engaging the various agencies responsible for managing Utah Lake resources and hiring new staff to manage and execute the program's technical, operational, and collaborative components.
- Sustainable funding:** Long-term success will require a dedicated funding source. Without sustained investment, Phase 1 gains may stall, and the lake could regress to its current degraded state. The Utah Legislature's directive reflects a commitment to lasting stewardship—funding must match that ambition.
- Managing expectations:** Utah Lake enhancement will be a long-term, phased effort. Progress will be incremental, guided by pilot projects and phased, iterative management. Clear communication about timelines, milestones, and anticipated outcomes will be key to maintaining public and legislative support.

A Call to Action

The ULS Report presents a bold, science-driven roadmap for restoring one of Utah's most iconic waterbodies. This ambitious effort includes what could become the largest carp removal initiative in the country—positioning Utah as a national leader in innovative lake restoration. By addressing key stressors through phased, adaptive management and fostering collaboration across agencies and communities, the state has a unique opportunity to set a precedent in watershed enhancement. With sustained commitment, dedicated resources, and clear communication, Utah Lake can become a model for resilient, multibenefit restoration. The time to act is now—together, we can shape a healthier, more vibrant future for Utah Lake.