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Scott J. Cameron
Acting Commissioner
Bureau of Reclamation
Sent via email to crbpost2026@usbr.gov
March 2nd, 2026

Re: Comments on Draft Environmental Impact Statement of Post-2026 Operational Guidelines and Strategies for Lake Powell and Lake Mead

Dear Mr. Cameron:

Thank you for the opportunity to comment on the Draft Environmental Impact Statement of Post-2026 Operational Guidelines and Strategies for Lake Powell and Lake Mead.

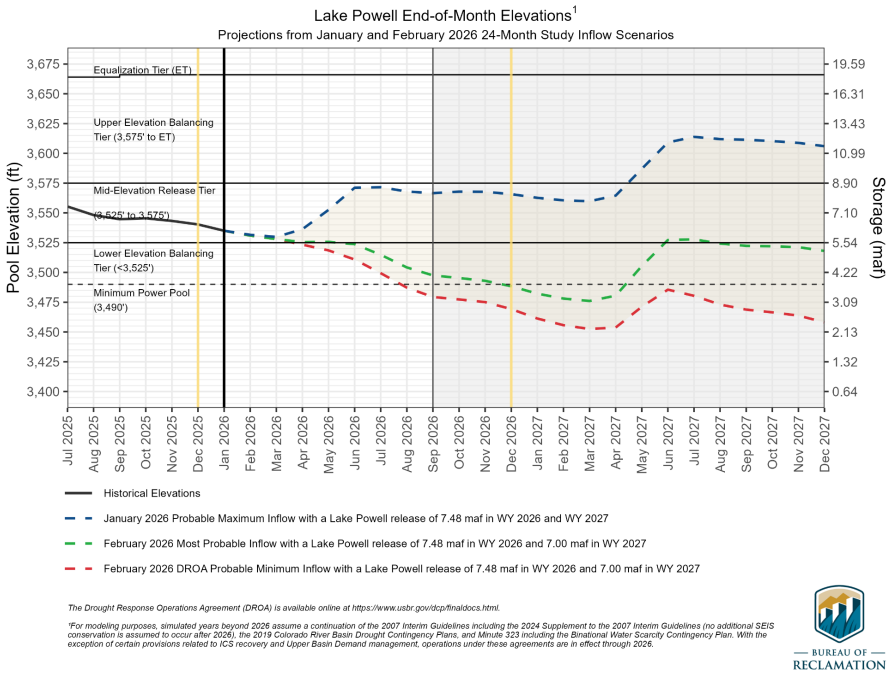
1. Introduction: Developing guidelines while at the edge of a cliff

The fate of the entire Colorado River system is in peril. While the circumstances we face as a Basin are unprecedented, they are not unpredicted. The scientific and water user communities have long acknowledged that the Colorado River is over allocated, and that consumption/demand has outstripped supply for most of the past two decades.[1] Furthermore, the deleterious effects of climate change have compounded this supply/demand imbalance, with numerous studies expounding the impacts of a warming basin and modeling future scenarios.[2] Every climate study that has been done on the Colorado River Basin predicts there will be less runoff in the years to come. Leading climate scientists Jonathan Overpeck and Brad Udall[3] have stated that “Half of the flow of the Colorado River may be lost due to climate change by mid-century.”

[1] http://www.inkstain.net/fleck/2022/08/how-we-got-into-this-mess-on-the-colorado-river/

[2] https://scholar.colorado.edu/concern/parent/8w32r663z/file_sets/ng451j49n

[3] https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2016WR019638?prg140729=773e85aa-cc35-4026-b6e0-b6b0a57f4f84



Bureau of Reclamation's February 24-month study shows the minimum probable scenario of Lake Powell reservoir dropping to minimum power pool this summer.

The Post-2026 NOI states that the new guidelines, "must be capable of both withstanding a broad range of future hydrologic and operating conditions and minimizing system vulnerability." This requires all parties to look at both hydrologic and operational risk and to develop guidelines that provide both flexibility and a balancing of all demands on the system. No one-size-fits-all approach will work. What is needed is leadership in structuring an array of options that reflect the variability of hydrology and the abilities of the states and federal government to step forward with realistic approaches. In an era of reduced snowpack volumes and increased hydrologic variability, reducing risk to water supplies is critical. The range of future hydrologic conditions should anticipate and plan for the worst-case scenario, i.e. the 40-50% reduction alluded to by Dr. Overpeck.

While dry hydrologies were in fact used in the DEIS modelling, **nearly every alternative still projects scenarios where Powell and Mead reservoirs drop below minimum power pool and deadpool, meaning they do not meet the purpose and need of the proposed action.** And given the absence of a state-led deal, we must assume that the likely preferred alternative will be a variation of the Basic Coordination Alternative, which under dry hydrologies (10-12 MAF natural flow) and extremely dry hydrologies (4.46-10 MAF), shows Lake Powell dropping below minimum power pool in a *high percentage* of scenarios. Given that initial conditions behind these models were developed some time ago and hydrological forecasts have been significantly downgraded, the risk of Powell crashing is much worse than what these models project.

Figure 3-8
WY Minimum and EOWY Elevations and Storage Volumes of Lake Powell

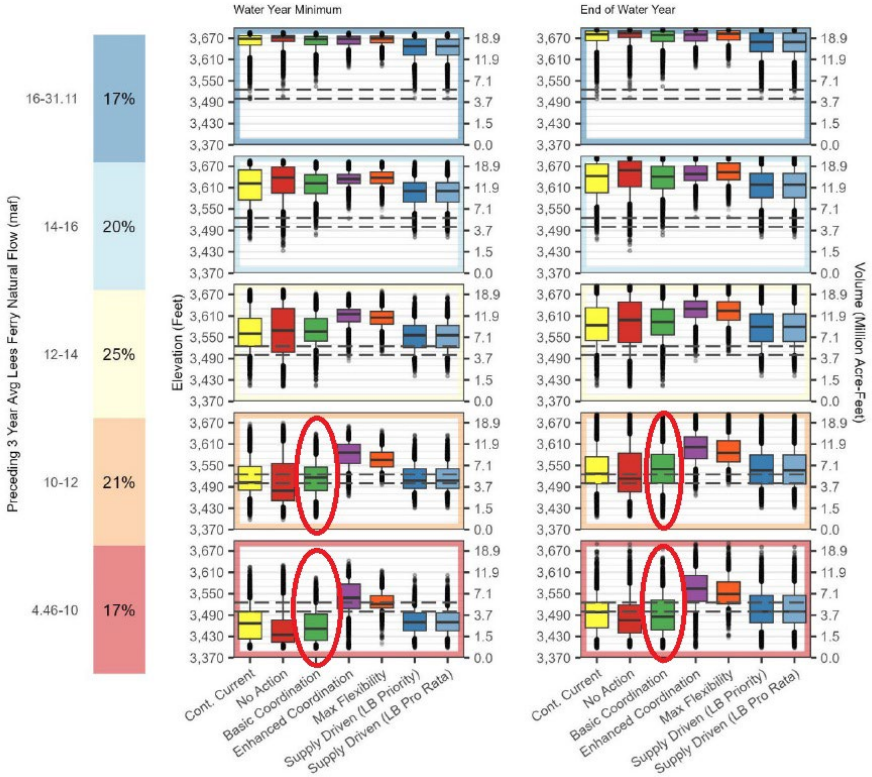


Figure 3-8 from the DEIS shows that under the Basic Coordination Alternative, Lake Powell falls below powerpool in a large portion of forecasts. With recent hydrology worsening, the likelihood of Powell hitting and dropping below minimum power pool has increased significantly.

While DEIS models and the most recent 24-month projections from Reclamation show Powell dropping below minimum power pool, Reclamation has been clear that it will not allow the reservoir to drop below 3500 "due to infrastructure limitations at Glen Canyon Dam." In the near term, Reclamation has stated that it will take DROA-like actions to prop up Powell above 3,500 feet above sea level (fsl), similar to efforts undertaken in 2022 and 2023. But DROA actions will likely only buy the system a year or two in a consistently dry hydrology. Language in the Drought Response Operations Agreement (DROA) acknowledges that these efforts may not be enough to avoid dropping below minimum power pool. Line 453 of the DROA document states that "if dry conditions persist or worsen, available storage volumes for potential adjustments or releases may be insufficient to protect the Target Elevation at Lake Powell. As such, Drought Response Operations may be ineffective and therefore futile."[4] **Federal responsibility to address likely future risk of meeting water supply demands should include an aggressive effort to increase operational flexibility at Glen Canyon Dam, not just waiting for the water to rise.**

[4]https://www.usbr.gov/uc/DocLibrary/Plans/20220103-Draft-2022DroughtResponseOperationsPlan-508-UCRO.pdf?ct=t(October_Lowdown10_20_2016_COPY_01)

In a 2024 technical memorandum, Reclamation describes that the Glen Canyon Dam's lowest outlets, the River Outlet Works (ROWs), are not safe for long term use.[5] While the ROWs have performed well for short term High Flow Experiments (HFE) when the reservoir is high, they have experienced cavitational damage when used for even short periods when the reservoir is low. The only times the ROWs have been used at low elevations were in 1965 as the reservoir was filling, and in 2023 during an HFE. In both cases of ROW use at low head operations, the outlets experienced cavitation. Glen Canyon Dam was designed for a “goldilocks” river that is not too high or too low. In 1983, a reservoir that was too high almost overtopped the dam and brought it down. Today we’re seeing it falter under a reservoir that is too low.

Reclamation has repeatedly said that the Post-2026 EIS is not “an infrastructure EIS,” yet the aim of every alternative includes “protecting infrastructure of Glen Canyon Dam.” The alternatives presented in the DEIS documents are clearly focused on shaping policy around the infrastructure and limited operational capabilities of Glen Canyon Dam. **Given this approach, Colorado River policy will be bent to extremes in order to keep Lake Powell above 3,500.**

In short, none of the alternatives presented will fully prevent Lakes Powell or Mead from crashing. And with the Final EIS likely to favor an alternative like the Basic Coordination Alternative—based on the existing authorities and rules—this EIS process all but guarantees the reaching of low reservoir operational limits at Lake Powell and Lake Mead. Despite this obvious reality, the DEIS makes no effort to identify and entertain new infrastructure protection and flexibility options like dam modifications or variations of a “one-reservoir” option. There have now been calls from multiple stakeholders to do this—not just from environmental groups, but from the Lower Basin states too.[6]

Absent a state-led deal, the Post-2026 EIS process has essentially yielded to a world where Powell drops to 3,500, and releases to the Lower Basin will be determined by the amount of water flowing into Powell. This is a direct contradiction to one of the DEIS’s stated purposes, to “provide Colorado River water users a greater degree of predictability with respect to annual water availability in future years under anticipated increasing variability, low runoff, and low-reservoir conditions.”

2. The DEIS failed to analyze modifications at Glen Canyon Dam, limiting the range of reasonable alternatives.

As demonstrated by the figures above and Reclamations’ February 2026 24-month study, there is a significant likelihood of Powell dropping below power pool and near dead pool. Reclamation should have *every operational tool available* to manage the system in low system hydrologic scenario, but those tools have been ignored in this DEIS.

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[5] https://glencanyon.org/wp-content/uploads/2025/12/20240326-EstablishmentInterimOperatingGuidanceGlenCanyonDamLowReservoirLevels-TechnicalDecisionMemo-508-TSC.pdf

[6] https://glencanyon.org/lower-basin-states-tell-interior-to-study-overhaul-of-glen-canyon-dam/

For years, GCI and other conservation groups have advocated for the study of a river-level bypass of Glen Canyon Dam,[7] which would include drilling new diversion tunnels around the structure, similar to its original diversion tunnels. A “full bypass" solution would allow for the full flow of the Colorado River around the dam, through the Grand Canyon and into Lake Mead. In the unlikely event that the excess storage would be needed again, the gates of these tunnels could be closed. Upper Basin water, once stored in Powell, could be stored in Lake Mead with a new accounting system developed and implemented in order to provide Upper Basin states with credit for water stored in Lake Mead.[8]

When Lake Powell and Lake Mead were at least partially full, there was little interest in this concept. Today, the combined contents of Lake Powell and Mead would only fill about half of Lake Mead, and Glen Canyon Dam will soon impede its original purpose of allowing the Upper Basin to meet its downstream, compact defined**,** delivery obligation. Now that both reservoirs are hovering near critical levels with the hydrology expected to get worse, the bypass concept has gained broader support.

Experts have pointed out that bypassing Glen Canyon dam would unlock the 5.9 MAF of water locked up behind the dam,[9] and reduce or eliminate evaporative losses at Lake Powell. Recognizing the impending water delivery crisis to downstream users, the Lower Basin states of California, Nevada, and Arizona wrote a letter to Reclamation in February of 2025 specifically asking for dam modifications to be incorporated into the Post-2026 EIS.[10] With concern to the ecosystem of the Grand Canyon below the dam, leading scientists have suggested bypass may be a key solution for the drying river, stating, “Such an action would restore a natural stream flow and sediment regime to the Grand Canyon and might benefit some pre-dam elements of the Colorado River ecosystem.”[11] And upstream of the dam in Glen Canyon, the restoration of its national park-caliber ecosystem,[12] cultural resources, and recreation opportunities could continue.

Despite the growing calls for Glen Canyon Dam bypass among stakeholders, and the obvious need to update the dam’s outdated engineering, concepts submitted by GCI and partner organizations that include re-engineering Glen Canyon Dam with river level bypass tunnels were not analyzed in this DEIS. The stated reason for this is that these concepts “would require such extensive statutory modifications or amendments that it is unlikely to be acceptable among stakeholders and would be inconsistent with federal law.” Both of these assertions are demonstrably false and exhibit a lack of forward thinking by the DOI.

a. To claim that modifying Glen Canyon Dam to operate at low levels is, “unlikely to be acceptable among stakeholders” is not supported by data. Some of the most influential

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[7] https://www.hcn.org/articles/the-coming-failure-of-glen-canyon-dam/

[8] https://glencanyon.org/fill-mead-first/

[9] https://www.inkstain.net/2025/12/colorado-river-deadlines-incentives/

[10] https://glencanyon.org/lower-basin-states-tell-interior-to-study-overhaul-of-glen-canyon-dam/

[11] https://wires.onlinelibrary.wiley.com/doi/10.1002/wat2.1672

[12] https://glencanyon.org/restoring-ecosystems-project/

stakeholders in the Basin have specifically asked for this.[13] The letter submitted to Reclamation by the Lower Basin states on February 13th, 2025 states that “Reclamation’s failure to consider an Alternative that addresses the Long-term Infrastructure Limitations from Glen Canyon Dam violates NEPA.” Additionally, the letter reads, “By not including an action alternative that resolves Glen Canyon infrastructure limitations, Reclamation impermissibly limits the range of reasonable alternatives.” Including dam modifications in the DEIS is just as acceptable as any other element of other alternatives considered. And as the Lower Basin letter implies, omitting this analysis violates NEPA and exposes stakeholders to a high risk of hydrologic failure.

According to this letter, the Lower Basin States believe that “Addressing the infrastructure limitations may be the one long-term measure that would best achieve operation and management improvements to the Glen Canyon Dam. Accordingly, Reclamation in this NEPA process must evaluate the impacts of infrastructure repairs, modifications and enhancements at Glen Canyon Dam.”

With a future certain to include multiple low flow years due to a warming climate, it is all but inevitable that the reservoir will drop to critical levels, despite efforts to prop it up. Not including at least one alternative in the EIS that looks at reengineering the dam is not only short-sighted, but negligent in presenting the public with a complete picture of the risk involved in future operations at Glen Canyon Dam. The government owes it to the public to give the full picture of the potential impacts and the solutions. Reclamation’s ongoing efforts to study the structural modification of Glen Canyon Dam must be incorporated into any near or long term planning on Colorado River operations. The implications of structural modifications should be studied and vetted thoroughly, especially in consideration to its effects on the environment, both upstream of the dam in Glen Canyon National Recreation Area and Canyonlands National Park and downstream in Grand Canyon National Park.

b. How can modifying Glen Canyon Dam be inconsistent with federal law, when the Bureau of Reclamation is in fact conducting a dam modification study right now? In 2023, Reclamation hosted a webinar revealing that the agency is looking at options to reengineer the dam to operate at lower levels.[14] They have since indicated that these studies are in the "appraisal phase,” and are seeking funding through proposed legislation as it moves toward the “feasibility phase.”[15] Clearly, dam modifications are both necessary and consistent with federal law and federal planning. The Lower Basin letter makes this argument well, taking issue with the fact that the dam modification study is occurring outside the mechanism of the EIS despite such modifications being a “major federal action” clearly subject to the EIS process.

Furthermore, the DEIS itself states that, “The alternatives in this Draft EIS are designed to cover a wide range of potential outcomes with respect to post-2026 operations; accordingly, they incorporate components that are within existing authorities along with components that would require new authorities and/or new agreements among Basin water users to fully implement.”[16]

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[13] https://glencanyon.org/wp-content/uploads/2025/03/lower-basin-letter-2-13-25.pdf

[14] https://glencanyon.org/reclamations-ideas-to-modify-glen-canyon-dam-leave-some-big-questions/

[15] https://www.congress.gov/bill/119th-congress/senate-bill/3743/text?s=2&r=1&q=%7B%22search%22%3A%22S.+3743%22%7D

[16] Post 2026 DEIS Executive Summary, pg ES-8

The DEIS analysis applies a double standard, deeming dam modifications as "inconsistent with federal law," yet acknowledging that other alternatives analyzed would require "new authorities," i.e., authorities that may not yet be consistent with federal law. **If, in fact, BOR feels it needs a new authority to move forward with its dam modification plans in a more concerted way, the agency should explicitly define what authorities are needed, so that all relevant stakeholders can understand the process.**

c. Re-engineering Glen Canyon Dam could "unlock" 5.9 million acre feet of water currently trapped behind Glen Canyon Dam. While the dam can theoretically be operated with levels as low as 3,374 fsl by relying solely on its River Outlet Works, Reclamation has said that they cannot be relied upon for long term use, and the dam will be treated as "run of river" at 3,500 fsl. For this reason, Policy experts now count only water stored above 3,500 fsl as "realistically accessible storage" at Lake Powell,[17] **meaning 5.9 million acre feet of water is essentially locked away from Colorado River users at a time when it's needed most**.[18]

Unlocking that amount of water from behind Glen Canyon dam into the system would add a significant one-time pulse, essentially producing water that was previously unavailable and could avoid some of the drastic cuts being proposed for Arizona. **The DEIS should have run a cost-benefit analysis to determine the costs of bypassing the dam, and the economic return of 5.9 new million acre feet of water**. This should be compared to other recent efforts to add water to the system, such as the Lower Basin conservation efforts funded by the Inflation Reduction Act, which some estimate to have saved water at an average cost of $417 per acre foot.[19] If the cost of bypassing Glen Canyon Dam was, for example, $2 billion and unlocked 5.9 million acre feet into the system, the price would come out to $339 per acre foot saved.

3. The DEIS failed to analyze Fill Mead First, or any variation thereof.

In addition to examining physical modifications at Glen Canyon Dam to allow water releases from low or run-of river levels, there is a need to evaluate how the entire Colorado River system would operate under such scenarios. This analysis should include reservoir consolidation, and prioritization of Lake Mead as the Colorado River's primary storage facility—ie: Fill Mead First. As stakeholders of the Basin develop operational strategies for Lake Powell and Lake Mead beyond 2026, Reclamation should have modeled a wide range of scenarios, including ones in which Lake Powell is at levels below 3,490 fsl.

Many leading scientists and policy experts along the Colorado River have advocated for a management approach where Lake Powell and Mead are viewed as one unit of water storage, rather than two separate storage facilities.[20] Some experts have even made the point that since Upper Basin users don't actually pull water from the reservoir, it is effectively a Lower Basin reservoir[21].

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[17] https://www.colorado.edu/center/gwc/ColoradoRiverInsights2025DancingWithDeadpool

[18] https://pubs.usgs.gov/sir/2022/5017/sir20225017.pdf

[19] https://www.ksl.com/article/51389468/paying-farmers-proves-most-cost-effective-way-to-conserve-colorado-river-study-says

[20] https://qcnr.usu.edu/coloradoriver/files/news/fs-white-paper-6.pdf

[21] https://www.youtube.com/watch?v=OLXX8vyMf50, GWC Summer Conference, Eric Kuhn, minute 1:21:00

From a perspective of maximizing water supply, the two-reservoir concept might have made sense in the 1956 Colorado River Storage Project Act and again in the 1968 Colorado River Basin Act. The underlying assumption, based on then-existing water supply and basin use levels, was that the system would be operated and managed at a near full level. The realities of a drier climate and modern consumption trends requires us to assess those assumptions and determine if they are still valid for looking forward.

Some policy experts have recently argued that the Upper Basin's delivery obligation is unsustainable in a dwindling river system[22]. **If the delivery obligation is changed, the primary purpose of Glen Canyon Dam will change as well**. As Eric Kuhn, former Director of the Colorado River Water Conservation District, said at the Getches Wilkinson Annual Summer Conference in 2023, "If the risk of a curtailment on the Upper Basin… is off the table, then the purpose of Lake Powell becomes very different."[23] In an operational scenario where the Upper Basin is no longer required to release 75 million acre feet every ten years at Lee Ferry, the Upper Basin could then be allowed to count its delivery further downstream at Lake Mead. Even in amounts lower than 7.5 million acre feet, the omission of the delivery obligation would open up more flexibility to consolidate storage in one reservoir versus the other in an effort to minimize evaporative and seepage losses, and optimize environmental conditions in Glen Canyon and Grand Canyon.

The DEIS states that, "This alternative was not advanced because prioritizing one dam over the other would not yield an integrated, resilient system." It also states, "A one-dam alternative would require such extensive statutory modifications or amendments that it is unlikely to be acceptable among stakeholders and would be inconsistent with federal law."

According to our analysis, this is a flawed argument:

While prioritizing water storage in Lake Mead over Lake Powell is a novel strategy, it may allow for greater flexibility in the system, and it is by no means an "all or nothing" approach. A Fill Mead First (FMF) approach would essentially be a type of inter-basin water storage exchange or conservation pool, similar to concepts analyzed in several other alternatives.

There is also nothing in the Law of the River that says it can't be done. According to the legal analysis, "Potential Legal Issues under the Law of the River Associated with the Fill Mead First Proposal" by Larry McDonnell published in *The Water Report,* **"The Fill Mead First Proposal is not precluded by any Federal or State statutes."***[24]*

The McDonnell analysis states, "FMF appears to offer some promise for increasing the efficiency with which we manage and use a declining water supply. If, in fact, further analysis demonstrates this is the case, FMF may well become a piece of the answer to how we bring

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[22] https://www.youtube.com/watch?v=OLXX8vyMf50, GWC Summer Conference, Eric Kuhn, minute 1:21:00

[23] Ibid.

[24] https://glencanyon.org/wp-content/uploads/2024/11/MacDonnell-Legal-Analysis.pdf?ct=t(December_Lowdown_12_22_2025_COPY_01)

basin water uses into line with reliable basin water supplies. The questions about its feasibility are not essentially legal but hydrologic and political. Its political feasibility will depend on whether reservoir operations under a FMF approach enhance the water use goals of the basin states."[25]

An accounting approach that prioritizes water storage in Lake Mead could offer flexibility to the system, encourage conservation in the Upper Basin by offering a new "protected pool" of Upper Basin water in Mead, and potentially save 30,000-50,000 acre feet a year by avoiding higher ground-seepage rates in the porous sandstones of Glen Canyon.[26] Though such an idea was considered outside the scope of previous NEPA analyses, it is now essential to view it as one of the potential options considering the current and anticipated hydrologic risk of the Colorado River. In order to have an informed discussion among Basin stakeholders, it's imperative to understand the benefits and tradeoffs of potentially reassessing how water is stored and managed in the Colorado River system. By not modeling scenarios in the DEIS that include Glen Canyon Dam being operated below minimum power pool and as a run-of-river facility, stakeholders and decision makers were not allowed to consider a full range of options in how the Colorado River and its reservoirs could be managed and how hydrologic risk could be reduced.

4. The DEIS analysis of affected environment and environmental consequences is flawed and misleading, especially regarding emerging ecological, cultural, and recreational resources in Glen Canyon, Cataract Canyon, Narrow Canyon, and the San Juan River.

Since the creation of the *2007 Interim Shortage Guidelines*, environmental and cultural resources have emerged in Glen Canyon that were not accounted for in previous NEPA analyses. Given the significance of these resources under NPS responsibilities and the mandates of the Grand Canyon Protection Act, the DEIS should have recognized and included an analysis of the importance of the emerging recreational and cultural resources in the tributary rivers and canyons, including rafting and hiking in Glen Canyon National Recreation Area. The impact of operational strategies that would re-inundate said resources must be recognized including consequences to vegetation, wildlife, and archeological/cultural sites. Many of these resources were unaccounted for when Glen Canyon Dam was constructed and today require a different perspective on their management and protection.

a. Geographic scope of analysis is blatantly erroneous

The stated geographic scope of the DEIS states, "Consistent with the geographic scope analyzed in the *2007 Interim Guidelines FEIS*, the geographic scope that would be affected by the proposed federal action begins at full pool of Lake Powell at Gypsum Canyon and extends downstream along the mainstream Colorado River floodplain to the Southerly International Boundary (SIB) with Mexico."

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[25] https://glencanyon.org/wp-content/uploads/2024/11/MacDonnell-Legal-Analysis.pdf?ct=t(December_Lowdown_12_22_2025_COPY_01)

[26] https://qcnr.usu.edu/coloradoriver/news/wp1

While the 2007 EIS contained *similar* language concerning the area of Lake Powell, it did not specify Gypsum Canyon as the limit of geographic scope.[27] The 2007 FEIS stated, "The geographic region that would be affected by the proposed federal action begins with Lake Powell and extends downstream along the Colorado River floodplain to the Southerly International Boundary (SIB) with Mexico."

Gypsum Canyon and the bottom of the recently formed whitewater rapid near its mouth is at elevation 3,610 fsl.[28] This error in geographic analysis omits 60,126 acres of land above 3,610 fsl and below Lake Powell's actual full pool elevation of 3,700 fsl.[29] It also omits including in the analysis the extensive ecological, cultural, and recreational resources that have returned in this area.

b. NPS Mandates, Grand Canyon Protection Act, and Endangered Species Act

With ten national park units directly affected by Colorado River operations, NPS plays a significant role in developing and assessing all operational strategies. They did in the Glen Canyon Environmental Studies (1982-1996) and subsequent Colorado River processes. The decisions made around how Glen Canyon Dam is operated will have widespread effects on areas and resources that fall under the jurisdiction of NPS. As NPS is responsible for "conservation of natural and cultural resources and administers visitor use",[30] it is essential that decisions around how to manage Lake Powell, Glen Canyon, Grand Canyon, and Canyonlands incorporate up-to-date information on changing and emerging resources in those park units.

Additionally, Public Law 102-575, which includes the Grand Canyon Protection Act requires that Glen Canyon Dam be managed "in such a way as to protect, mitigate adverse impacts to and improve the values for which Grand Canyon National Park and Glen Canyon National Recreation Area were established, including, but not limited to natural and cultural resources and visitor use."[31] Public Law 102-575 has not been repealed and as such has to be acknowledged and used to establish the parameters of any EIS analysis.

Reclamation must plan and manage for Endangered Species Act compliance not just in Grand Canyon National Park, but also in Glen Canyon National Recreation Area. The DEIS includes minimal and mischaracterized impact analyses in the "restoration zone" of GCNRA (above current reservoir level and below 3,700 fsl), where extensive emerging ecosystems could provide habitat for threatened and endangered species.

It is encouraging to see that the DEIS includes analysis of impacts to two endangered species in Glen Canyon's restoration zone – the Colorado Pikeminnow and Razorback Sucker – in

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[27] https://www.usbr.gov/lc/region/programs/strategies/FEIS/Chp1.pdf

[28] Returning Rapids 2025 Field Binder, page 28

[29] FEIS, Lake Mead and Lake Powell Area Capacity charts, Appendix A

[30] https://www.usbr.gov/lc/region/programs/strategies/RecordofDecision.pdf, page 3

[31] Grand Canyon Protection Act of 1992, P.L. 102-575, Sec. 1802(a).

habitats above elevation 3,598 fsl.[32] **The DEIS recognizes that re-inundation of the river corridors on the Colorado and San Juan Rivers would have negative effects on these critical habitats**.

But the analysis of other biological resources mischaracterizes the impact of higher reservoir levels on Glen Canyon's restoration areas, including impacts to the flora and fauna now established in tributary canyons above Lake Powell's current elevation and below its full pool elevation. GCI, participating experts, and members of the public have documented the presence of wildlife in the restoration zone,[33] including numerous beaver ponds, and a sighting of a Mexican Spotted Owl (threatened species) in an emerged side canyon in GCNRA in 2022.[34]

The impact analysis of wildlife in the Glen Canyon region erroneously assumes that higher reservoir levels at Lake Powell would be beneficial to wildlife in the region. **In fact, higher reservoir levels would destroy tens of thousands of acres of habitat for beaver, deer, Bighorn sheep, and other wildlife.**

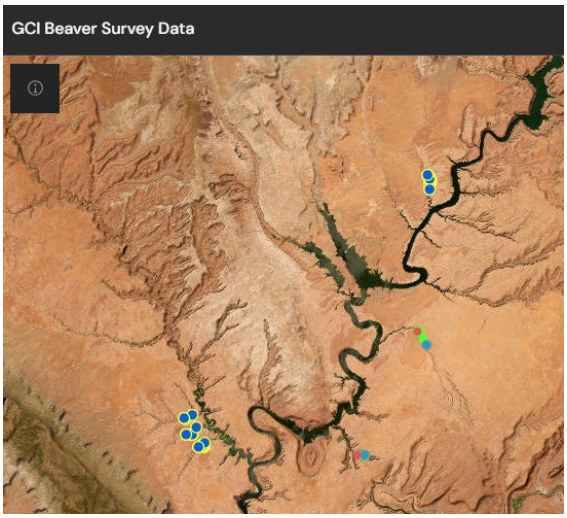
A group of Bighorn sheep stranded during a rapid rise in Lake Powell elevations in July of 2023.[35] Rising reservoir levels have extensive negative impacts on wildlife in GCNRA.

[32] Post 2026 DEIS ES-39

[33] https://www.instagram.com/reel/CywQhSEyB3T/?utm_source=ig_web_copy_link&igshid=N2ViNmM2MDRjNw==

[34] https://www.sltrib.com/news/environment/2022/08/28/glen-canyons-side-canyons-spring/

[35] https://www.youtube.com/watch?v=kDNHR6XJL24



(Left) a map highlighting beaver activity documented in GCNRA below 3,700 fsl.[36] (Right) scientists survey beaver activity in a restoring side canyon at approximately elevation 3,630 fsl. Beaver communities have expanded into vast reaches of Glen Canyon's restoration zone, below elevation 3,700 fsl. If the level of Lake Powell were to rise, this wildlife habitat would be destroyed.

c. Emerging resources in Glen Canyon and tributary canyons

Geologic Wonders

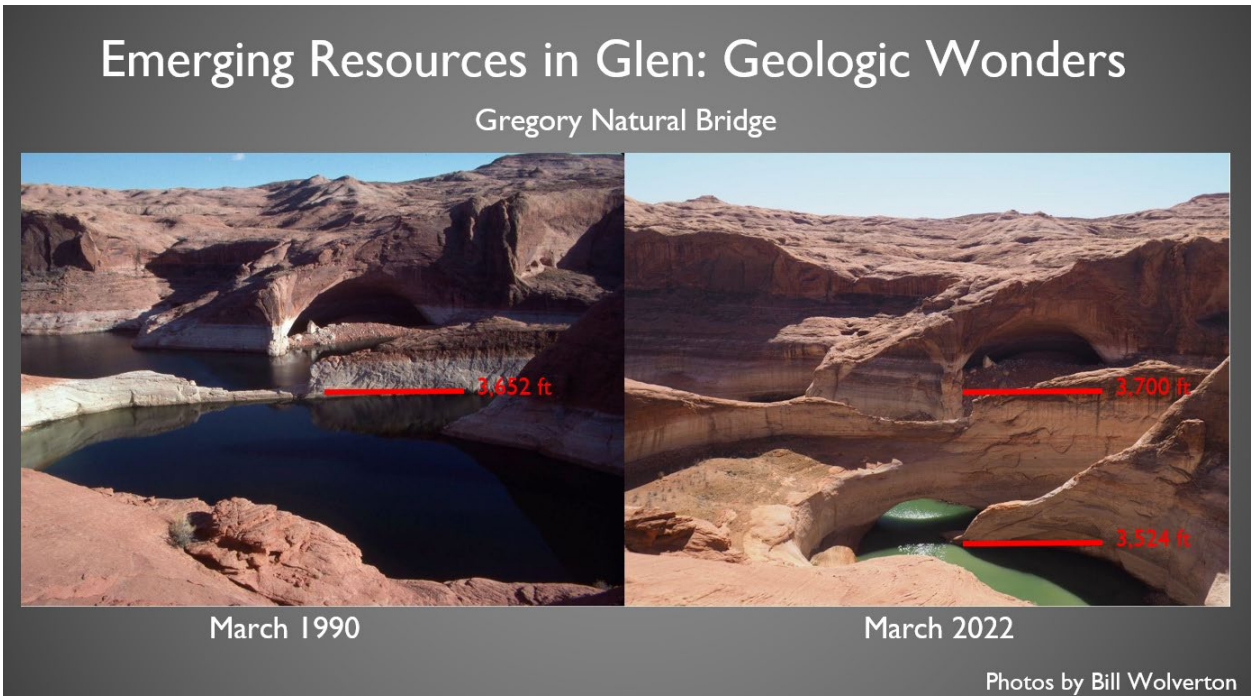
Glen Canyon National Recreation Area has experienced extreme changes in the past 20 years as Lake Powell water levels have receded. As of winter 2026, over 100,000 acres of land that were once inundated under Lake Powell has emerged.[37] Unique geologic and natural features like Cathedral in the Desert, Gregory Bridge, La Gorce Arch, and countless waterfalls, grottos, alcoves, and other natural wonders once again became highlight features of the canyon. These one-of-a-kind features are what inspired former Interior Secretary Harold Ickes to propose making Glen Canyon the central part of a larger Escalante National Monument in the 1930's, and what inspired countless western writers like Wallace Stegner, who said Glen Canyon would have made a "superb national park." The emergence of these treasures have garnered attention from national and international media outlets,[38] and have even been used for tourism promotions by GCNRA concessionaires.[39] **When the level of Lake Powell rises, these features are submerged by the reservoir, and are effectively lost to visitors.**

[36] https://glencanyon.org/community-science-initiative/

[37] Root, J. C., & Jones, D. K. (2022). Elevation-area-capacity relationships of Lake Powell in 2018 and estimated loss of storage capacity since 1963 (No. 2022-5017). US Geological Survey.

[38] https://www.newyorker.com/magazine/2021/08/16/the-lost-canyon-under-lake-powell

[39] https://marketing.revinate.com/public/promotion/view-in-browser/message-log/97e341cc-9266-4408-9b84-e434c4f437c8



A photographic comparison of Gregory Natural Bridge, which is inundated at higher reservoir levels, and revealed at lower reservoir levels. One of numerous resources impacted by reservoir levels at Lake Powell.

The DEIS's analysis of these geologic and visual resources is woefully inadequate for such a significant part of the Colorado Plateau. The DEIS only mentions two "attraction features" in its analysis: Cathedral in the Desert and the backs of Glen Canyon and Hoover Dams. Glen Canyon is home to hundreds if not thousands of visual/recreational attractions. Ignoring the impact of reservoir inundation on these attractions is a major flaw in the DEIS.

Reestablishing Vegetation

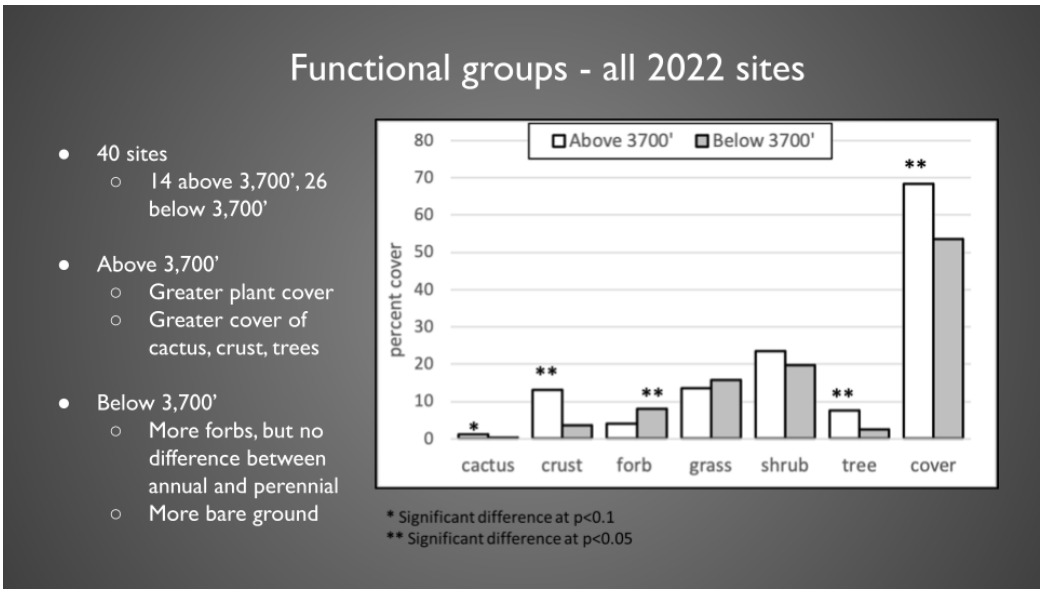
As the reservoir levels have dropped, large-scale ecological succession is taking place in Glen Canyon and its side canyons, tributary rivers, and streams. In winter of 2026, over 40 new miles of the Colorado River are flowing once again in what used to be the northern reach of Lake Powell, as well as 40 miles on the San Juan River, 13 miles flowing on the Escalante River, 10 Miles on the Dirty Devil River, and hundreds of linear miles of creeks and stream flowing in the 100-plus side canyons of Glen Canyon. Across this landscape, the ecosystems surrounding Glen Canyon are rebounding.[40]

In many once-drowned tributary canyons of Glen Canyon, well-established groves of native species like Goodings Willow, Coyote Willow, and Fremont Cottonwoods have reestablished and are thriving.[41] These riparian forests are of great significance in many places throughout the Colorado River Basin, with resource managers going to great lengths to restore and protect

[40] https://www.sltrib.com/news/environment/2022/08/28/glen-canyons-side-canyons-spring/

[41] https://content.jwplatform.com/previews/6H3H1RhH

them for species habitats and as opportunities for ecological restoration. Recent research has documented the abundant return of plant life in emerged canyons. Documented native plant species in these areas include globemallow, wirelettuce, scorpion weed, sacred datura, four wing salt bush, matted crinkle mat, wooly plantain, Jone's blue star, woody aster, desert trumpet, milkvetch, sticky brittle bush, purple three awn, common pepperweed, threadleaf sunflower, Indian rice grass, sand sage, and prickly pear cactus.[42]



Graph by Seth Arens, WWA 2023.[43]

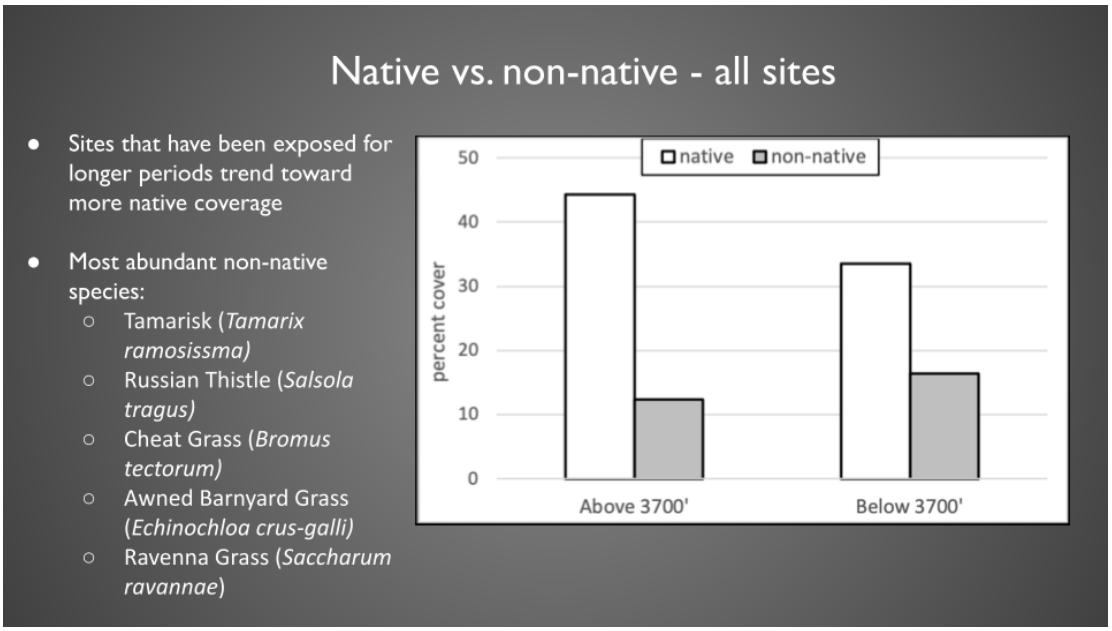
A new vegetation survey led by researcher Seth Arens of Western Water Assessment observes vegetation composition in emerged areas in Glen Canyon,[44] finding that areas that have been out of water for more than 2-3 years are generally dominated by native plant species like willow and cottonwoods.[45] As of fall 2025, the survey, operating under a NPS Research Permit, has established 89 transects in 20 locations throughout Glen Canyon.

[42] Babtiz, Kendra, MPP. The Botanical Recovery of 50-Mile Canyon, *Hidden Passage: The Journal of Glen Canyon Institute*, issue XXV, Fall 2019 https://www.glencanyon.org/wp-content/uploads/2020/02/Hidden-Passage-25.pdf

[43] https://www.youtube.com/watch?v=Yfyb6dNLsx0

[44] https://wwa.colorado.edu/sites/default/files/2023-06/CataractCanyonPoster_051123.pdf

[45] https://www.youtube.com/watch?v=Yfyb6dNLsx0



Graph by Seth Arens, WWA 2023.[46]

It is encouraging to see that the DEIS acknowledges these emerging habitats in section 3.9, stating, “native shrubs are outcompeting nonnative plants on sites that have been exposed for more than 3 years; these shrubs are providing diverse ecosystems, including hanging gardens and cryptobiotic crusts, where natural flow patterns are reestablishing (Arens 2023). Two special status plant species are present in the Lake Powell reach and could be affected by operations.”

But the impact matrix on page ES-41 contradicts the aforementioned characterization of riparian ecosystems that thrive when Lake Powell is at low levels. Performance in this matrix appears to be based simply on annual variability in water level fluctuations and assumes higher reservoir levels are good for Glen Canyon vegetation characteristics, while low water is bad. This assumption is undocumented and unsupported. **Lower reservoir levels are what allow for succession and diversity to continue; high reservoir levels kill that vegetation by inundating it (see images below)**. The analysis misinterprets the Arens data cited, and fails to acknowledge that variability doesn’t impact vegetation as much as absolute reservoir elevation.

[46] https://www.youtube.com/watch?v=Yfyb6dNLsx0

(Left) Reestablishing riparian corridor in Davis Gulch, elevation 3,565 fsl, May 2023. (Right) same location March 2024, demonstrating the destructive impact of increased reservoir elevations on riparian vegetation. During the rise of Lake Powell reservoir after the big water year of 2023, countless miles of riparian habitat were destroyed by inundation.

Archaeology

Glen Canyon is home to thousands of archaeological sites that were inundated by the water behind Glen Canyon Dam during the years that it filled. Many of these culturally significant archaeological sites, including structures, rock art, and springs, have emerged along with other resources.[47][48] The DEIS mischaracterizes the impacts of reservoir operations on these socially and culturally important resources, assuming that higher reservoir levels "protect" them by drowning them, while lower reservoir levels cause harm. **The DEIS highlights potential impacts to these sights after emerging from the reservoir, like vandalism and wave action, but fails to acknowledge the impact of being re-inundated by the reservoir.**

With the 65 foot rise of Lake Powell in Summer 2023, 30,000 acres of lakeshore and tributary canyon were once again submerged,[49] which re-drowned exposed archaeological sites, likely causing additional damage beyond what occurred when the reservoir first filled. Any alternative that increases Lake Powell reservoir levels increases the likelihood that other archaeological resources are re-inundated, like what happened to sites during the reservoir's rise in 2023.

d. Emerging resources in Colorado and San Juan Rivers

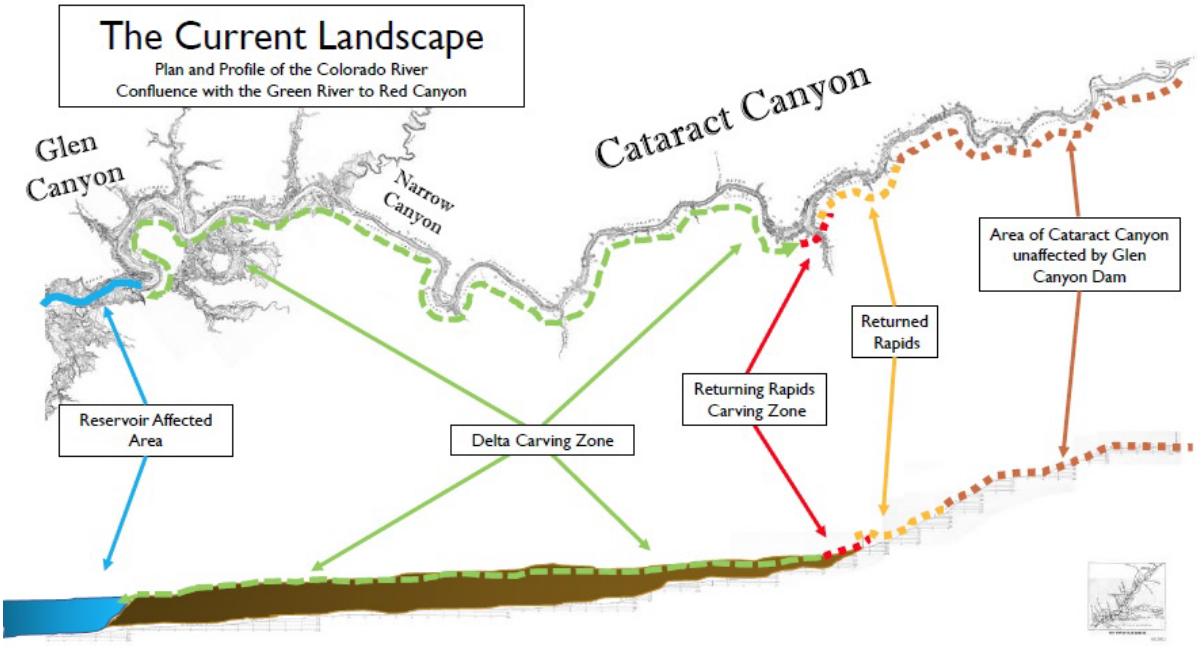
Cataract Canyon, located below the confluence of the Green and Colorado Rivers, is home to some of the most notorious whitewater in North America. It is known by many river rafters and guide companies as "Utah's Grand Canyon." When Lake Powell was full, the flowing river and whitewater rapids of Cataract Canyon ended below Big Drop 3 Rapid, which is also the administrative boundary between Canyonlands National Park and Glen Canyon National

[47] https://www.sltrib.com/news/2022/10/24/cultural-sites-are-being/

[48] https://www.knau.org/knau-and-arizona-news/2022-05-12/archaeological-sites-once-thought-lost-under-lake-powell-reappear-as-water-drops

[49] Root, J. C., & Jones, D. K. (2022). Elevation-area-capacity relationships of Lake Powell in 2018 and estimated loss of storage capacity since 1963 (No. 2022-5017). US Geological Survey.

Recreation Area. Since Lake Powell's decline from its most recent peak in 1999, the flowing Colorado River in Cataract Canyon has reestablished itself in what used to be a reservoir.



Map and cross section of emergent sections of Colorado River entering Glen Canyon. Returning Rapids 2022 Field Binder.

What was left behind from Lake Powell's retreat are massive sediment deposits in Cataract, Narrow Canyon (just downstream), and upper Glen Canyon. Over the years as Lake Powell has dropped in elevation, a large amount of reservoir sediment in Cataract has been scoured away, and the natural characteristics of the Colorado have begun to reestablish. This transformation has been documented extensively by The Returning Rapids Project,[50] which has conducted numerous research trips in the reemergence area with coordination from NPS, USGS, GCMRC, and multiple researchers from the University of Utah and Utah State University. This portion of lower Cataract Canyon is a living laboratory of what restoration will look like and the challenges of managing it.

Cataract Canyon is 41 miles long and historically had 49+ rapids in its approximately 400 feet of gradient. Out of those 41 miles, 24 were affected by the reservoir and its resulting sediment delta. Out of the 49+ rapids, all but 23 were impacted by the reservoir and then covered by the sediment delta. Since aridification and the retreat of the reservoir began in the mid 2000s, 7 major rapids have reemerged. In late winter of 2026, there were approximately 44 miles of flowing river in the mainstem Colorado River that were once inundated.[51]

[50] https://www.returningrapids.com/

[51] Returning Rapids 2023 Field Binder

In Cataract Canyon, the return of the river and its whitewater rapids have created a recreational experience that hasn't been available since the reservoir first drowned the canyon. 3,000 to 4,000 visitors to the park unit raft down this section of river every year.[52] The prospect of a returning river rafting economy to Glen Canyon has been discussed publicly by former GCNRA superintendent Billy Shott.[53] The rapids that have returned in lower Cataract Canyon add significant experiential value to a Cataract Canyon trip—one of Utah's most economically valuable rafting destinations and most popular expeditions from outfitting companies around the region. For much of the past decade, there has been river current all the way to the Hite area, and parties can run Cataract without the use of motors—which reduces the overall carbon footprint of this recreational activity.

There has been significant ecological succession on the mainstem Colorado River in Cataract Canyon below full pool elevation. A recent study by Kasprak et al. describes revegetation of the mainstem tributaries of the Colorado and San Juan Rivers, highlighting that, "Despite decades of inundation and sediment accumulation, we see evidence that native vegetation and dynamic land cover changes occur within several years following re-exposure."[54]

The vegetation surveys by Arens have shown a snapshot of what those plant assemblages look like from survey work at several sites at tributary canyons within Cataract.[55] A summary of the study states:

> "Across all sites and years, 44 vascular plant species were observed in belt transects. At sites above 3,700 feet and not flooded by Lake Powell, 41 plant species were observed; at sites below 3,700 feet, 28 plant species were observed. Plant species present in transects were generally typical to Colorado Plateau upland desert and riparian ecosystems. Several previously flooded sites were dominated by native shrub species (coyote willow and seep willow), had lower abundance of non-native plants and native shrubs were generally more abundant than the non-native tamarisk."

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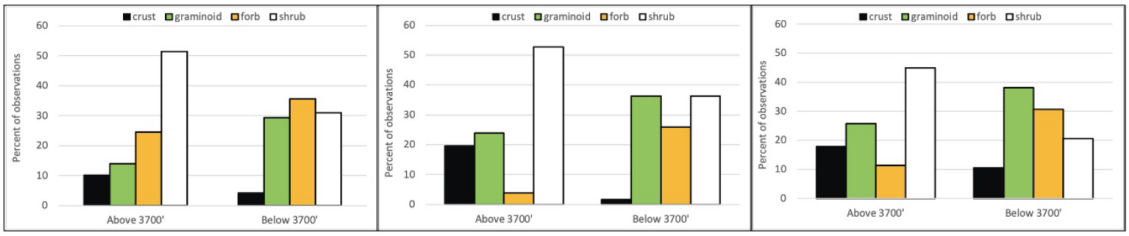
[52] Returning Rapids 2023 Field Binder

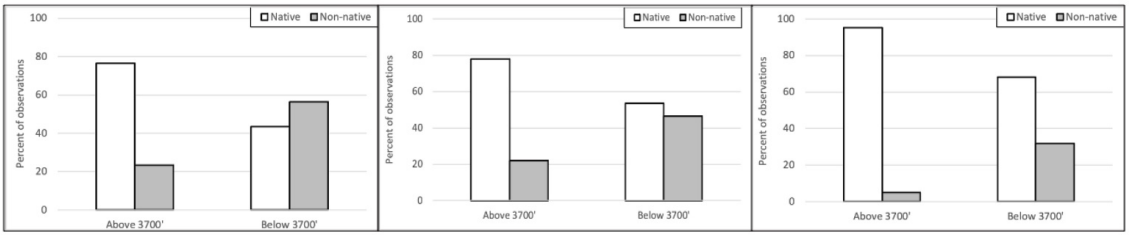
[53] https://lakepowellchronicle.com/article/the-future-of-gcnra-lake-powell

[54] https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2025JG009355?prg140729=b6dd0b46-4b1a-417d-ac04-63e82cfcfba6

[55] https://wwa.colorado.edu/sites/default/files/2023-06/CataractCanyonPoster_051123.pdf



Percent of plant species observations by plant functional group, including a category for cryptobiotic crust and site elevation from belt transects at all sites in 2019 (left), 2020 (center) and 2021 (right).



Percent of native and non-native plant species observations grouped by site, above (not flooded) or below (flooded) 3,700 feet, from belt transects at all sites in 2019 (left), 2020 (center) and 2021 (right).

Charts on Cataract Canyon vegetation above and below elevation 3700 ft. Seth Ares, WWA.

On the San Juan River, a similar emergence of the river corridor has taken place with the retreat of Lake Powell. In late winter of 2026, there were approximately 45 miles of flowing river into areas once submerged by Lake Powell. The geographic and geologic characteristics of the San Juan River and watershed are different from the mainstem Colorado: the river gradient is less steep, and the pre-dam river channel was much wider with areas where the river braided through wide shallow reaches.

A group of river boaters camped at the mouth of Nokai Canyon on the San Juan River in April 2023 - an area that used to be submerged by Lake Powell. Returning Rapids 2023 Field Binder. Elliot Ross Photo.

At full pool in the 1980s-2000, the reservoir backed the river up all the way to Grand Gulch. As the reservoir level receded in the 2000s, the aggradation of sediment did not. It's possible that the full pool level being near Paiute Farms greatly amplified the area's ability to trap sediment. The continued backfill traveled upstream several more miles, covering the river corridor and rapids with sediment up to 40 feet above Lake Powell's full pool line.[56]

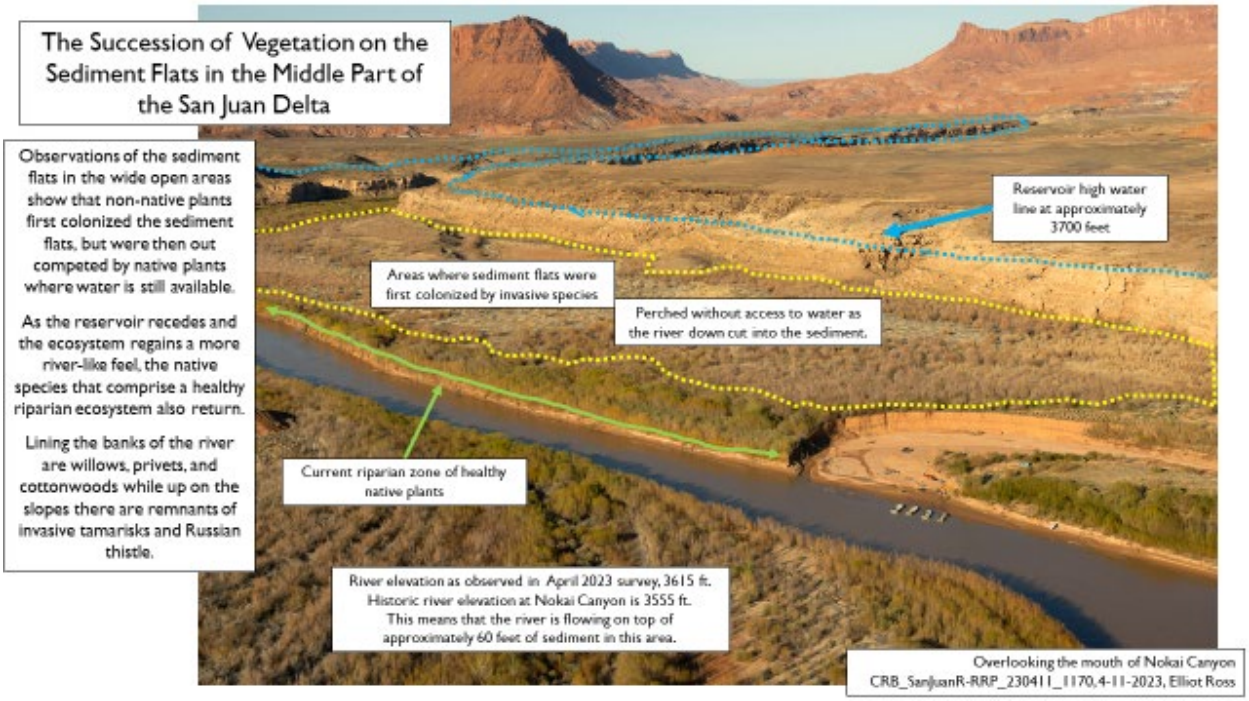


Image highlighting new vegetation on the emerged riparian corridor of the San Juan River near Nokai Canyon. Returning Rapids 2023 Field Guide. Elliot Ross Photo.

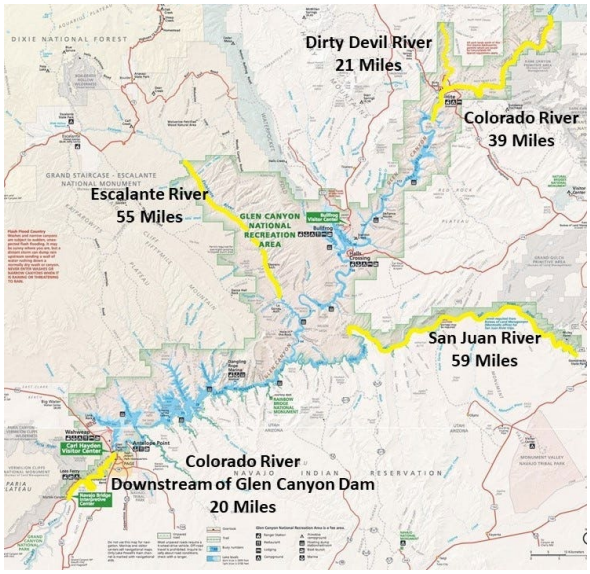
Rafter floats next to a large grove of cottonwood trees on the San Juan River at elevation ~3,630 ft.

[56] Returning Rapids 2023 Field Binder

The rapidly changing river corridors of the Colorado and San Juan Rivers are providing new recreational opportunities in GCNRA that didn't exist in the 2007 Interim Guidelines, as well as large-scale ecological succession. These emerging areas are enhancing the ecosystem and helping to provide habitats for listed and endangered species.

Page 3-151 of the Draft EIS states, "Glen Canyon NRA receives approximately three to five million visitors annually (NPS 2025b). Lake Powell is the primary recreational feature within Glen Canyon NRA, and it supports swimming, power boating, houseboating, water skiing, fishing, personal watercraft use, nonmotorized boating, hiking, camping (developed and primitive), and viewing of cultural and geologic resources."

The statement and subsequent impact analysis fails to acknowledge the existence and economic value of whitewater rafting that takes place within the GCNRA boundary, specifically below the full pool elevation of 3,700 fsl. It only analyzes whitewater rafting below the dam, and omits the returned river corridor in Cataract Canyon and flowing river on the San Juan. **Glen Canyon National Recreation Area is, in fact, a park unit full of flowing rivers.** Within the boundaries of GCNRA, there are a cumulative ~190 cumulative navigable river miles (see figure below).



A map of flowing river miles within GNRA boundaries.[57]

Referring to this area solely as "Lake Powell" and not Glen Canyon demonstrates that reservoir recreation is favored over river recreation or ecosystems. This section focuses on the potential impacts to reservoir and reservoir-based recreation. There is no mention of how to manage both the rivers *and* the reservoir in areas affected by management of Lakes Powell and Mead. In

[57] https://glencanyon.org/glen-canyon-by-the-numbers-more-than-a-reservoir/

order to fully understand the environmental and recreational impacts of reservoir operations on these sections of river, the DEIS should have included them in its analysis. The American public deserves to get an accurate assessment of the recreational resource values within Glen Canyon and how they will be affected by operational reservoir management decisions.

5. The need to consult Tribes on impacts to Glen Canyon Resources

According to the National Park Service, 19 American Indian Tribes and bands have an association and cultural affiliation with Glen Canyon—including contemporary descendants of the people who left behind the thousands of archaeological sites in the canyon.[58] The Navajo, Hopi, Ute, Southern Paiute, Zuni and Puebloan tribes all have deep connections to Glen Canyon, and consider it to be part of their ancestral homelands. When the canyon was flooded (1963-1980), hundreds of Tribal members were either forcibly or administratively displaced;[59] their homes, farms and sacred sites were drowned.[60] As more ancestral lands emerge from the reservoir, there is an opportunity for the federal government to develop cooperative and collaborative Tribal management that recognizes their historical, cultural, and social use of the area. There could be recreational economic opportunities for guiding, like the Hualapai tribe does in the Grand Canyon, or the Navajo Nation does in Antelope Canyon. By omitting the aforementioned Glen Canyon resources from analysis, the DEIS missed an opportunity to consult Tribal leadership on those resources' archaeological, ecological, and recreational value.

6. The DEIS failed to acknowledge sediment impacts in Glen Canyon

With the combination of Lake Powell's retreat and the massive amounts of sediment accumulating in Glen Canyon every year, massive sediment deltas are emerging and consistently moving in Glen Canyon, affecting water supply, storage volume, access, and the viability of long-term operation of Lake Powell reservoir. Increasing sediment accumulation as a function of increased hydrologic variability in Glen Canyon should have been considered in operational strategies in the DEIS.

These deltas are moving down through the mainstem river canyons. In the coming 20-50 years these "mud glaciers" will greatly affect the viability of the reservoir's storage capacity.[61] In areas where the reservoir once was, mitigation efforts need to be taken where the sediment is damaging resources.

On the San Juan River, the original river channel has been displaced causing a waterfall at Paiute Farms, which will create challenges for future rafting recreation and ecological challenges. The lack of riverine ecosystem connectivity at the falls has impacts on native fish

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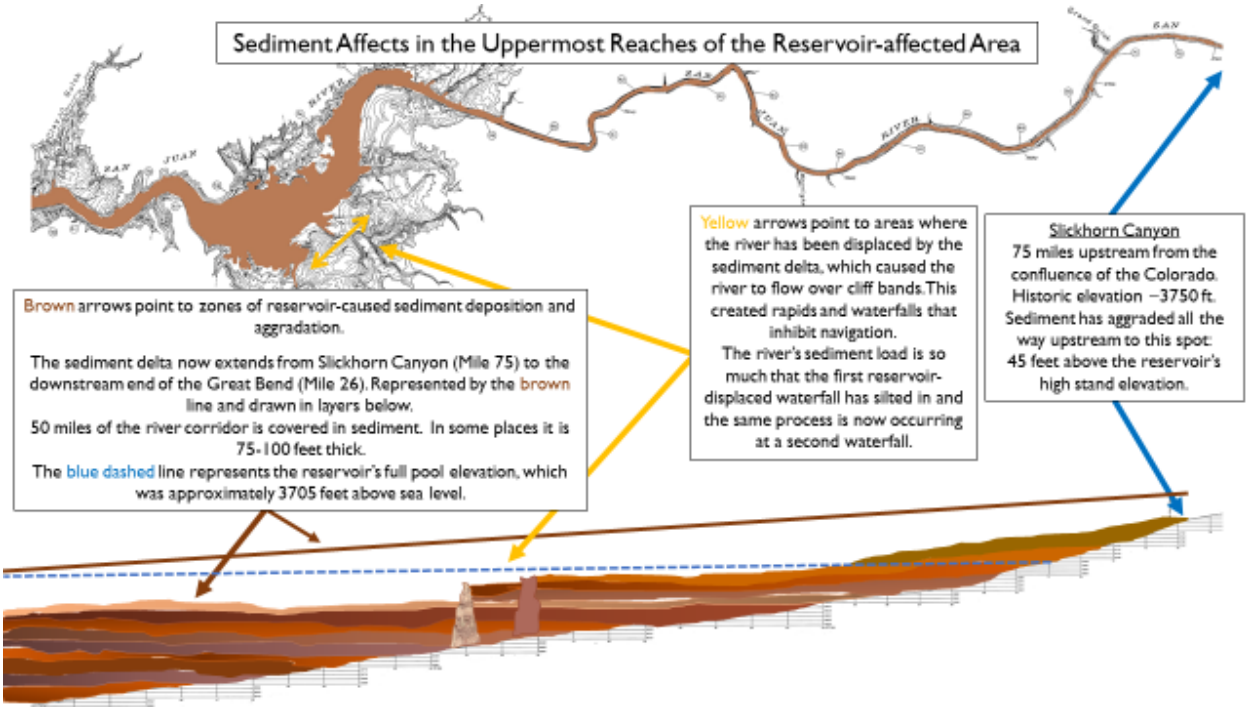
[58] https://www.nps.gov/glca/learn/management/foundation-document.htm

[59] https://digitalrepository.unm.edu/hist_etds/21/

[60] Graham, Taylor. Oral Histories: Charley Bulletts on Glen and Grand Canyon, *Hidden Passage: The Journal of Glen Canyon Institute*, issue XXVI, Fall 2020 https://www.glencanyon.org/wp-content/uploads/2021/02/Hidden-Passage-Final-Version-2021.pdf

[61] https://www.kunc.org/environment/2022-08-04/a-mud-caked-terra-incognita-emerges-in-glen-canyon-as-lake-powell-declines-to-historic-low

populations, which is acknowledged in the impact analysis only as a function as a barrier preventing invasive fish from moving upstream. But the waterfall has blocked upstream sediment from the San Juan, impacting not just the newly flowing sections of river below Lake Powell's full pool level, but even causing river sediment to back up farther upstream.[62]



Graphic showing sediment cross sections and waterfall formations on the San Juan River. Returning Rapids Project 2023 Field Binder.

According to a 2026 report from the Returning Rapids Project, it's believed that a similar waterfall may soon develop near Hite at the end of Narrow Canyon.[63] The emergence of such a waterfall would create a significant safety hazard and impact the recreation opportunities for private boaters and outfitters who utilize that section of river.

Any long-term operation plans must acknowledge how sediment is managed in Glen Canyon. This approach should address issues related to river/waterway access (river or reservoir), resource impacts, and resource remediation above areas where the reservoir will likely not be anymore. Understanding the sediment dynamics will allow the National Park Service, the Bureau of Reclamation, and the State of Utah to plan, fund, develop and manage infrastructure and public safety programs within Glen Canyon National Recreation Area. The recently completed USGS sediment survey of Lake Powell should form one of the elements of this assessment[64].

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[62] Gene Stevenson, March 2000

[63] https://drive.google.com/file/d/1GjXkcsgT3pZcldT1UenOFw0rNOKCdaZx/view

[64] https://pubs.usgs.gov/publication/70230440

7. Conclusion

Glen Canyon Institute supports a scientific approach to assessing the impacts of Glen Canyon Dam on the resources of Glen Canyon and the Grand Canyon. We stand ready to support a scientifically-based, transparent, and forward-looking approach to future operations of the Colorado River. We appreciate the opportunity to comment on such a consequential Draft EIS, but wish that more time had been allowed for stakeholders to review and formulate comments. With a document this size, a brief 45-day comment window suggests that substantive stakeholder input was a low priority.

Thank you for taking the time to consider our comments.

Sincerely,

Eric Balken
Glen Canyon Institute