March 2, 2026

Bureau of Reclamation
Attn: BCOO-1000
P.O. Box 61470
Boulder City, NV 89006

Electronically submitted to: crbpost2026@usbr.gov

RE: Post-2026 Operational Guidelines and Strategies for Lake Powell and Lake Mead – Draft Environmental Impact Statement

Dear EIS Coordinators:

The Arizona Game and Fish Department (Department) appreciates the opportunity to provide input to the Bureau of Reclamation's (Reclamation) Federal Register notice of January 16, 2026 Post-2026 Operational Guidelines and Strategies for Lake Powell and Lake Mead – Draft Environmental Impact Statement (EIS). The Department manages fish and wildlife resources within the Colorado River watershed and its system of reservoirs, rivers, and canals of Arizona and is aware of the effects long-term drought has had on their habitats in the Colorado River Basin, and in the broader Southwest.

Under Title 17 of the Arizona Revised Statutes (ARS), the Department, by and through the Arizona Game and Fish Commission, has jurisdictional authority and public trust responsibilities to conserve and protect the state fish and wildlife resources. In addition, the Department manages threatened and endangered species through authorities of Section 6 of the Endangered Species Act and the Department's 10(a)(1)(A) permit. It is the mission of the Department to conserve and protect Arizona's diverse fish and wildlife resources and manage for safe, compatible outdoor recreation opportunities for current and future generations. In addition to ARS Title 17 authorities, the Department has jurisdictional authority under ARS Title 5 Chapter 3 Boating and Water Sports, regulations, and boating opportunities in coordination with partners at water bodies around the state.

The Department recognizes and supports the Arizona Department of Water Resources' (ADWR) concerns regarding the State's water security and the importance of maintaining reliable water deliveries to Arizona consistent with the Colorado River Compact and the Law of the River. While water allocation and delivery decisions are outside the Department's statutory purview, the Department emphasizes that operational decisions must identify contingency actions and mitigation measures that ensure continued water delivery to Arizona while minimizing negative impacts to aquatic resources, wildlife, and recreation.

For your consideration, the Department provides the following comments based on the agency's statutory authorities, public trust responsibilities, and special expertise related to wildlife resources, wildlife-related recreation, and boating recreation as they relate to the Federal Register notice.

High Risk Non-native Fish

Drought conditions in the Colorado River basin persist and have led to lower available run-off and lower reservoir elevation levels in many system reservoirs, including Lake Powell above Glen Canyon Dam. As Lake Powell's elevation drops closer to the dam's penstocks, the quality of water released from the dam continues to change from what the system had experienced since the dam was constructed. Consistent with the State's priority to maintain water security while minimizing ecological impacts, the Department has concerns that the ongoing elevated water temperatures and low dissolved oxygen levels pose a threat to a number of downstream resources, including the establishment of non-native species such as Smallmouth Bass (SMB) as well as impacts to native fish and the Rainbow Trout fishery at Lee's Ferry below Glen Canyon Dam.

Over recent years as the elevation of Lake Powell has been reduced, water temperatures at Lees Ferry have increased during the summer and fall. As a result of the critically low elevation of Lake Powell in 2022, the water temperature at Lees Ferry was observed above 20℃ (68℉; August-October 2022), which is 4-5℃ warmer than has been recorded prior to 2021. Implementation of coolmix flows that are now allowable through the 2024 Supplemental EIS has been critical to maintaining temperatures in the system that would disadvantage high risk non-native warm water species. Based on monitoring programs and results presented at the most recent Glen Canyon Dam Adaptive Management Program (GCDAMP) annual reporting meeting, coolmix has so far been effective in preventing the establishment of SMB. The Department believes that this active management tool will be necessary in the future to continue to reduce the risk of establishment of non-native warm water fishes. As it pertains to operational alternatives identified in this draft EIS, the Department urges Reclamation not to adopt operational changes or restrictions that could compromise the continued use of coolmix to protect downstream resources and to fully evaluate the role of infrastructure solutions and the Upper Initial Units (UIUs), as components of the Colorado River System, in supporting downstream delivery and temperature management objectives.

Higher water temperatures coming through Glen Canyon Dam and the increased risk of fish entrainment due to low reservoir elevations are the driving factors for establishment of SMB and other high risk non-native fish species downstream of the dam. Although these factors are a result of the existing water conditions within the Colorado River basin, both release temperature and entrainment can be influenced and managed by operations at Glen Canyon Dam. The Department continues to request that Reclamation evaluate and enhance infrastructure enhancements - such as selective withdrawal structures, thermal control devices (e.g., thermal curtains), bypass generation configurations, or other forebay modifications - that would reduce entrainment risk and maintain release temperatures that disadvantage high risk non-native species and reduce their establishment potential.

High risk non-native fish invasions can also occur from downstream in Lake Mead as reservoir elevations change and potentially affect the fish passage characteristics of Pearce Ferry Rapid, which has become an important barrier prohibiting non-native fishes (such as Channel Catfish, Common Carp, and Striped Bass) from moving upstream into the Grand Canyon. While reservoir elevations are influenced by broader basin hydrology and Compact-driven delivery requirements, the Department does not support reservoir management strategies intended to maintain low Lake Mead elevations for ecological purposes. Instead, the Department recommends that Reclamation identify and analyze contingency mitigation measures to prevent upstream expansion of high-risk non-native fish invasions in the event that Pearce Ferry Rapid becomes inundated or its passage characteristics change under any operational scenario.

Lees Ferry Rainbow Trout Fishery

The Department is concerned about higher water temperatures impacting the Blue Ribbon Rainbow Trout fishery at Lees Ferry below Glen Canyon Dam. The Lees Ferry tailwater has hosted a recreational Rainbow Trout fishery since it was first managed as a "put-grow-take" fishery in 1964. Lees Ferry has grown in importance and reputation locally, regionally, nationally, and internationally since it was managed and recognized as a Blue Ribbon Fishery in 1977. Anglers from around the world travel to Lees Ferry to fish for high quality Rainbow Trout. This Blue Ribbon fishery has become a financial and economic mainstay for the small community of Marble Canyon, the City of Page, and Coconino County. A 2013 statewide angler survey estimated the contribution of the Lees Ferry fishery to the State's economy in excess of $16.8 million, helping to support 251 jobs in Arizona (Fedler 2014).

Consistent with the State's priority to maintain reliable water deliveries under the Colorado River Compact while minimizing ecological and economic impacts, the Department emphasizes that maintaining suitable release temperatures below Glen Canyon Dam is critical to sustaining this nationally recognized recreational resource. Anglers support local businesses such as hotels, restaurants, and other service providers, in addition to utilizing fishing and outdoor recreation equipment suppliers and guides. The Glen Canyon Dam Long-Term Experimental and Management Plan (LTEMP) states the resource goal for the Rainbow Trout fishery is to "Achieve a healthy high-quality recreational Rainbow Trout fishery in Glen Canyon National Recreation Area (GCNRA) and reduce or eliminate downstream trout migration consistent with NPS fish management and ESA compliance" (Bureau of Reclamation and National Park Service, 2014). Maintaining cold water releases to <16°C (<60.8°F) from Glen Canyon Dam is critical for achieving this resource goal.

The forecasted water conditions in the Colorado River basin will create less favorable conditions for the Lees Ferry Rainbow Trout fishery in coming years without active management of releases from Glen Canyon Dam. Water temperatures at Lees Ferry in 2022 approached the critical thermal tolerances for Rainbow Trout, and the maximum probable release temperature projections are high enough to pose a continued risk of significant mortality events. Negative effects are expected even from sub-lethal warm water. Recent bioenergetic models on the response of Rainbow Trout to warmer temperatures at Lees Ferry suggests the food base cannot

sustain adequate growth rates under these conditions, and declines in fish condition are expected (J. Korman, Ecometric, pers. comm.).

In addition to temperature concerns, low dissolved oxygen levels represent a risk to the Rainbow Trout fishery. Rainbow Trout are susceptible to increased stress, disease, and death when dissolved oxygen levels dip below 5 ppm. High runoff events have been shown to lead to low dissolved oxygen plumes developing and traveling through Lake Powell. Similar to the way reservoir elevations affect release temperatures, lower reservoir levels make it more likely that these plumes will pass through Glen Canyon Dam due to their relative position to the penstocks. Although oxygen saturation levels tend to stabilize through diffusion and aeration in the river, the negative effects of low dissolved oxygen are exacerbated at higher temperatures and pose a threat to Rainbow Trout below the dam, particularly within the first five miles, which represents the most productive reach of the Lees Ferry fishery.

This fishery has experienced two major collapses over the past two decades, one in 2006 and another in 2014/15. Recent modeling of Rainbow Trout responses to warmer temperatures at Lees Ferry suggests that another fishery collapse is highly probable. The fishery required many years to recover after each previous collapse, and the current status (e.g., lowest relative abundance in 20 years of monitoring) suggests that the next recovery could take even longer. Maintaining release temperatures <16 °C is essential to sustaining a healthy, high-quality recreational Rainbow Trout fishery in GCNRA .

Although temperatures of 16-18°C fall within the range of preferred range for Rainbow Trout, recent analysis presented to the Technical Working Group of the GCDAMP suggests that elevated temperatures increase basal trout metabolism. When combined with the limited food base at Lees Ferry, these conditions are expected to stress and starve trout (J. Korman, Ecometric, pers. comm.). Rainbow Trout recruitment has been limited since 2018, and the current population is largely composed of older and larger fish. These larger fish are more susceptible to metabolic effects of warmer water and lower dissolved oxygen. The Department is concerned that temperatures in Lees Ferry could exceed those that could sustain any population of Rainbow Trout, let alone meeting the LTEMP goal of a high quality recreational fishery.

Reclamation should prioritize infrastructure and operational tools that provide long-term release temperature control capacity - such as the use of coolmix where available and advancement of selective withdrawal or thermal control technologies - to maintain river conditions beneficial to the Rainbow Trout fishery, while remaining consistent with Compact compliance and the State's water delivery priorities. Release temperatures <16 °C are also critical to minimize predatory impacts of Green Sunfish, which are prevalent in the Lees Ferry reach, and to minimize the risk of SMB establishment. Recommendations to maintain cool water releases to support the Rainbow Trout fishery are consistent with actions being implemented to protect native fish communities further downstream in the Grand Canyon.

As noted, structural modifications to Glen Canyon Dam or forebay installations, such as a thermal curtain, that allow for release of cooler water at lower water surface elevations are needed as an effective management tool for downstream resources. Reclamation is currently

pursuing these technologies; however, the Department requests that Reclamation expedite scoping and feasibility analysis where possible to preserve downstream resources while supporting reliable water delivery and infrastructure protection objectives.

Changes in other water quality parameters, such as salinity and total dissolved solids, and to the degree to which these parameters are influenced by reservoir management, are less understood. However, the Department is concerned about potential increases in these metrics and associated negative effects on biota, both in reservoirs and in the Colorado River below Glen Canyon Dam. Additionally, the influence of soluble reactive Phosphorus on productivity in the system is only beginning to be quantified but appears to be strongly correlated (Yard et al. 2023). Recognizing the State's priority to maintain reliable water deliveries to Arizona consistent with the Colorado River Compact, the Department recommends that Reclamation evaluate and implement mitigation measures - such as temperature control infrastructure, selective withdrawal, aeration, bypass configurations, or other forebay modifications, as discussed above - within those delivery parameters to address potential water quality impacts to downstream biological resources.

Boating and Recreation Access

Boating and fishing are among the highest valued public recreational uses at Lake Mead and Lake Powell. Recent studies have quantified the substantial economic contributions these outdoor and wildlife-related recreational activities provide to local economies. For example, fishing related expenditures for the Arizona side of the Colorado River system in Mohave County, which includes food, lodging, transportation, and equipment, was estimated at $95.8 million dollars by the Department-funded report, 2013 Economic Impact of Fishing in Arizona (Fedler 2014). It has also been estimated that more than 60 percent of visitors to the Lake Mead National Recreation Area use some form of motorized watercraft (Rosen et al. 2012). Several boat ramps at Lake Mead and Lake Powell have become unusable as water levels have declined, raising significant concerns about impacts to public boating recreation and to the Department's access for management activities on these large and popular reservoirs. Limited boat access to these reservoirs can hinder fish monitoring efforts of economically important sport fisheries and for conservation efforts of the federally listed Razorback Sucker in Lake Mead. Additionally, boat ramp closures complicate multi-agency aquatic invasive species (AIS) surveillance and boat decontaminations that are critical for controlling the spread of AIS.

Recognizing that reservoir elevations are driven by basin hydrology and Compact-compliant delivery requirements, and that there are specific primary authorized purposes of the Boulder Canyon Project, the Department does not make specific recommendations related to managing recreational elevations. However, the Department encourages Reclamation and National Park Service partners to proactively evaluate and implement adaptive infrastructure solutions - such as ramp extensions, relocations, or alternative low-water access facilities - so that boating access and resource management activities can continue under a range of hydrologic conditions.

Current management plans for boater access appear to focus on actions that would occur only if reservoir elevations improve, as no launch ramp extensions or relocations are proposed on the Arizona side of the reservoir. Given the prolonged drought, continued low runoff conditions, and

uncertainty surrounding future reservoir elevations, the Department is concerned that this approach may limit future boating access and impair effective fisheries management and aquatic invasive species control efforts at two of the largest reservoirs in the United States.

Impacts to Resources Downstream of Hoover Dam

The Department is concerned that changes in operations at Lake Mead could reduce river flows in ways that compromise aquatic and terrestrial wildlife habitat in the Lower Colorado River. Sustained and predictable releases from Lake Powell and Lake Mead, consistent with Compact-compliant deliveries to the Lower Basin, are important for maintaining backwater habitats and riverine conditions that support wildlife resources. Lower flows in the Colorado River threaten numerous backwater habitats important for wildlife and recreation. National Wildlife Refuges (NWRs) along the Lower Colorado River represent an essential corridor for waterfowl and other wildlife through the Sonora and Mojave Deserts.

The Havasu NWR Complex recently had to purchase water pumps to bring water back into the Pintail Slough canal area after the Colorado River levels dropped below the elevation needed to sustain natural inflows. This has significantly affected canal fisheries, and duck hunting in that zone is no longer possible. Low water levels have also negatively impacted the Cibola NWR. Fluctuating water levels have required continual maintenance and reconstruction of boat ramps throughout the Colorado River system around the refuge, including Topock Marsh, to maintain public access. Low flows have also contributed to low dissolved oxygen levels near Imperial NWR along the channel to Martinez Lake, resulting in seasonal fish kills. The Department requests that Reclamation fully consider how operational changes at Hoover Dam, within the context of maintaining required deliveries to Arizona and the Lower Basin, may affect downstream habitat conditions, associated wildlife resources, and recreational uses.

The Department is a participant in and financial contributor to the Lower Colorado River Multi-Species Conservation Program (LCR MSCP) and works collaboratively with Reclamation and other partners to implement conservation measures under the program's Section 10 permit, in coordination with Section 7 compliance obligations. If river operations strategies result in additional mitigation requirements to maintain Endangered Species Act compliance, it will be important to ensure that Section 10 permittees, including the states, are not assigned responsibility for mitigation associated with federally directed operational decisions. Continued coordination between Reclamation and the LCR MSCP Steering Committee will be necessary to maintain program compliance consistency.

Additionally, the U.S. Fish and Wildlife Service operates Willow Beach National Fish Hatchery located below Hoover Dam and stocks approximately 90,000-100,000 Rainbow Trout annually into the Colorado River. The hatchery depends on cold water releases from Lake Mead to raise Rainbow Trout. If release temperatures from Hoover Dam rise above 21℃, hatchery production and stocking efforts would be adversely affected. In addition to providing recreational angling opportunities important to local communities around the Colorado River, the hatchery also plays a role in recovery and augmentation efforts for listed species such as Bonytail and Razorback Sucker. The loss of this trout fishery may also exacerbate the caddis fly nuisance issues in the

Bullhead City area because fewer trout would be available to consume these benthic invertebrates during large hatch events. Sustained release conditions that support hatchery operations are therefore important both for recreational fisheries and native fish conservation.

Recommendations Re: High Risk Non-native Fish, Rainbow Trout Fishery, and Recreation Access

Current conditions and projected future water levels will limit effective management of the Rainbow Trout fishery and high risk non-native species within the Colorado River. Recognizing that water allocation and delivery decisions are outside the Department's statutory purview, and that continued Compact-compliant deliveries to Arizona are a primary State priority, the Department recommends that Reclamation prioritize infrastructure changes that enable long-term release temperature control and entrainment reduction within the context of annual release volumes. Such actions may include selective withdrawal structures, thermal control devices, forebay modifications, and evaluation of generation capacity within bypass tubes to maintain operational flexibility while minimizing impacts to water storage. The Department also recommends Reclamation evaluate fish deterrents or exclusion technologies in the Glen Canyon Dam forebay to reduce entrainment of warmwater, high risk non-native fish through the dam.

The Department acknowledges the complexity of managing the Colorado River System, including Lake Powell, Lake Mead, and the Upper Basin Initial Units, which by statutory definitions are part of the system and may contribute to meeting downstream delivery requirements. Upfront infrastructure investments that improve control of water quality are likely to be more cost effective over time than recurring expenditures for non-native fish control efforts to protect the federally threatened Humpback Chub population. Moreover, non-native control actions are unlikely to be effective unless paired with water temperature reduction. Proactive investment in temperature management measures would therefore reduce long-term costs while remaining consistent with the State's priority to maintain deliveries to the Lower Basin.Solutions for maintaining cold water releases (<16°C), where achievable within annual operating parameters, are mutually beneficial to multiple downstream resources listed in LTEMP, including the Rainbow Trout fishery and native fish such as the Humpback Chub. The Department recommends that Reclamation continue to implement temperature management tools, such as coolmix and other available infrastructure solutions, that maintain release temperatures below 16°C (<60.8°F) and dissolved oxygen above 5 ppm to the extent practicable within delivery requirements.

Guidelines and strategies that influence Lake Mead elevations have consequences for native fishes in the Grand Canyon if Pearce Ferry Rapid becomes inundated or its passage characteristics change. The Department recommends that Reclamation identify and analyze contingency mitigation actions - such as physical barriers, exclusion technologies, or mechanical removal programs - to prevent high risk non-native fish from colonizing the Grand Canyon under any operational scenario consistent with required deliveries.

The Department requests that NPS Glen Canyon National Recreational Area and Lake Mead National Recreation Area, in coordination with the Department and Reclamation, identify,

design, and construct adaptive low-water boating access facilities capable of functioning under a range of hydrologic conditions. These efforts should focus on infrastructure solutions rather than reservoir elevation management and may include ramp extensions, relocations, or alternative access points on the Arizona side, where feasible. In addition to reservoir-based boating recreation, Lees Ferry below Glen Canyon Dam supports motorized riverine trout fishing opportunities in Arizona. The Department recommends that, where operational flexibility exists within established annual releases, Reclamation should evaluate flow configurations that minimize abrupt daily fluctuations that impair safe motorboat access while remaining consistent with delivery requirements.

The Department also requests that Reclamation fully consider how operational changes at Hoover Dam, consistent with maintaining required deliveries to Arizona and the Lower Basin, may affect downstream habitat conditions and associated recreational and wildlife-dependent uses at public access sites in the Lower Colorado River, including Havasu, Cibola, and Imperial NWRs.

Thank you for the opportunity to provide input on the post 2026 reservoir operational strategies for Lake Powell and Lake Mead. For further coordination, please contact Ryan Mann at rmann@azgfd.gov or by phone call to 623-236-7538.

Sincerely,

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AGFD # M26-01123700

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