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May 9, 2016

Glen Canyon Dam LTEMP Draft EIS
Argonne National Laboratory
9700 S. Cass Ave. EVS/240
Argonne, IL 60439

Transmitted electronically to:

<https://parkplanning.nps.gov/commentForm.cfm?documentID=70123>

Re: Glen Canyon Dam Long-Term Experimental and Management Plan Draft Environmental Impact Statement (LTEMP DEIS)

Dear Mr. Billerbeck, Ms. Beverley Heffernan, Ms. Katrina Grantz, and Mr. LaGory:

Living Rivers, Colorado Riverkeeper, Center for Biological Diversity, River Runners for Wilderness, Save The Colorado and Poudre Waterkeeper submit the following comments for the Glen Canyon Dam Long-Term Experimental and Management Plan Draft Environmental Impact Statement (DEIS).

After four decades of Interior's attempts to address the declining habitat conditions in the river corridor of Grand Canyon National Park (GCNP) resulting from operations at Glen Canyon Dam (GCD), it's critical now to treat this EIS opportunity as the major step forward in what must be a remedy to the ongoing failure of Interior's past ambivalence.

Unfortunately, consistent with the conclusions of our scoping comments of January 2012, this DEIS, and the process leading to its generation, further illustrate Reclamation's disregard for a truthful description of the affected environment and the alternatives requiring consideration to deliver on the action's need and purpose as derived from the Grand Canyon Protection Act (GCPA). This DEIS merely represents a recommendation for how one aspect of operations at GCD may be occasionally altered to tinker with one habitat variable affecting a single remnant population for a single endangered fish species, while ignoring many other impacts of GCD's operations on critical habitat in the river corridor of GCNP. Moreover, the six years taken by Reclamation to deliver this minutia, illustrates the perpetuation of the agency's ongoing lack of commitment to the protection of endangered species and recovery in GCNP's river corridor. Further, Reclamation's willful misrepresentation of the growing risks associated with GCD's operational safety, the security of its water storage and hydropower generation benefits, as well as threats to water quality, not only renders it's suite of alternatives and assessments thereof, wholly incomplete, but renders a tremendous injustice to the Colorado River society

as a whole by denying the public a truthful and up-to-date assessment of the known risks associated with the continued operations of GCD and the implied benefits therein.

Living Rivers' scoping comments, 2012: <http://www.riversimulator.org/Resources/NGO/LTEMP/LTEMPeisCommentsLivingRivers31Jan2012.pdf>

1. Misrepresenting the Affected Environment

A. Climate Change Impacts on Hydrology

Climate change represents the most significant uncertainty affecting the implementation of the preferred alternative. While the DEIS acknowledges that future Colorado River runoff reductions as reported by Vano, et al. (2013) could be as high as 45%, the DEIS provides no scenarios of how its various alternatives perform under such a scenario. Information is provided related to water supply and demand imbalances from the 2012 Basin Study, but these results have been discredited by many. Nor do they have any relationship to projected flow volumes through Grand Canyon specifically. The DEIS must evaluate each alternative against the most current range of authentic peer-reviewed projections for climate change impacts on Colorado River hydrology.

B. Hydropower Uncertainty

In December of 2013 Lynn Jeka, Director of the Western Area Power Administration (WAPA), presented to the Colorado River Water Users Association and Upper Colorado River Commission a plausible hydrologic scenario leading to a potential loss of GCD power generation within 24 months; this risk has eased little in the intervening 30 months. Moreover, WAPA's power generation from the Colorado River Storage Project have already been significantly compromised due to reduced surface water streamflow, necessitating increased open-market purchases to meet customer contract obligations. The hydropower generation uncertainty given the above climate change hydrologic risks have not been sufficiently addressed by the DEIS. It contains no discussion of either current trends in generation capabilities over the past 15 years, nor how the potential realization of future streamflow reductions as numerous studies suggest, will affect the Basin Fund's ability to finance the experiments and research directly related to the purpose and need for this proposed action.

Jeka, 2013: <http://www.riversimulator.org/Resources/WAPA/CRWUA2013DecemberJekaPresentation.pdf>

Moreover, this increased hydrologic uncertainty illustrates further the decreasing value of GCD as regional energy supplier. As the DEIS accurately states, the facility has longtime lost the major benefit that large-scale hydroelectric facilities provide to the energy grid, the ability to market peaking power. As WAPA has reported, and climate change projections support, GCD's overall generating capacity cannot necessarily be relied upon as a consistent power source.

Lastly, the DEIS claim that “Hydropower is cleaner than nonrenewable fuel resources...” (Ch 3, p 4), is highly subjective, and in the case of GCD, grossly misleading. The existence of the GCPA and the administrative history surrounding the dam’s operation since, is testament to GCD’s extensive downstream impacts on critical habitat in one of the world’s most famous national parks. Moreover, it’s arguable, that precisely because of such known environmental impacts upstream and downstream, its highly unlikely that such a hydroelectric facility would even be proposed today, much less constructed.

C. Flood Routing and Safety

The DEIS states that: *Prior to construction of the dam, there was considerable seasonal and annual variability in flow and water temperature. Annual peak discharge typically reached between 85,000 to 120,000 cfs with records of 300,000 cfs, while flows in late summer, fall, and winter could be less than 3,000 cfs (Wright et al. 2005; Webb et al. 2005; Vernieu et al. 2005). (Ch 3, p 34)*

This is a rather incomplete and out-of-date assessment of such a critical natural process affecting GCD management and GCNP. The first written record of high magnitude floods in the Colorado River basin occurred in Mormon diaries from 1862. In 1944 the USGS estimated the peak flow of this event was 400,000 cfs at the site of Topock Bridge near Needles, CA (WSP 918). The expedition members of John Wesley Powell noted high water lines 50 feet higher than the low water elevation, and Powell’s second expedition took a remarkable photo of a perched driftwood snag in Cataract Canyon as evidence. Photos by Reclamation at the dam site in Boulder Canyon indicate flood scour of the canyon walls to be 80 feet above the low water mark. The snow melt peak of 1884 was estimated to be 300,000 cfs at the site of Hoover Dam, and the snow melt volume of this flood was estimated to be 30 million acre-feet.

Swain, 2002: <http://www.riversimulator.org/Resources/Hydrology/CoRiverFloods.pdf>

Slack water deposits (remnants of entrained sediment) from high magnitude floods located along the upper Colorado River above Moab, Utah (above the confluence with the Green River) are perched 50 feet above the low water elevation of the river and the peak flow has been estimated to be over 300,000 cfs. Two such events have occurred in the last 2,000 years, according to the analysis of the sediment deposits.

O’Conner et al., 1994: <http://www.riversimulator.org/Resources/Hydrology/OconnerBaker1994.pdf>

Greenbaum et al., 2014: <http://www.riversimulator.org/Resources/Hydrology/2000YearRecordMagnitudeFrequenciesLargestUpperColoradoRiverFloodsMoabUtahGreenbaum2014.pdf>

Additionally, paleoflood studies now underway on the lower Green River in Canyonlands National Park also reveal a similar magnitude and frequency as the upper Colorado River study site above Moab.

Greenbaum et al., 2014: <http://www.riversimulator.org/Resources/Hydrology/GreenRiverPaleofloodResearch2014.pdf>

Analysis of the flood data from the Moab site indicates that the magnitude of a 100-year flood event is 1.5 times greater than the flood of 1884, which places the flood event of 1862 in the category of the 100-year flood. The magnitude of a 500-year flood is about 2 times greater than the flood of 1884, and 2.5 times greater for the 1000-year flood event. The probable maximum flood magnitude is 3 times greater.

A 100-year flood event, statistically speaking, is overdue by 55 years. The arrival of a 500- or 1,000-year flood is more difficult to assess, but they conceivably arrive in the expected life-span of GCD. If, for example, the 500-year flood arrived next year, the volume would refill Lakes Powell and Mead in about two months and, thereafter, it would be necessary to safely route at least 30 million acre-feet water to the Gulf of California for another two months. The outlets at Glen Canyon and Hoover dams were not designed to handle 4 to 5 months of sustained, high-volume flow. Development in the floodplain of the Colorado River below Davis Dam, which includes the Salton Sink (below sea level), cannot safely route 30 million acre-feet without significant damage to critical infrastructure. Should Glen Canyon Dam fail, the flood volume for Hoover Dam to route would double. The lag time between the two dams is 16 hours and the flow through the Grand Canyon would be about one million cfs.

Wilbur et al., 1933: <http://www.riversimulator.org/Resources/USBR/TheConstructionOfHooverDamInvestigationDesignProgress1933.pdf>

Additionally, given the now known increased risk of flooding, the DEIS must incorporate updated scenarios and projections to its 1998 "Dam Failure Inundation Study", to better understand the impacts to the river corridor in Grand Canyon and the communities and infrastructure downstream. The DEIS must address how such floods will be safely routed through GCD, and the impacts such routing will have on GCNP. The potential need for new flood storage practices and release scheduling, could significantly impact artificial flood prospects one way or the other depending on the alternative chosen, so too must be incorporated into the analysis of each of the alternatives.

Latham, 1998: <http://www.riversimulator.org/Resources/USBR/GCDDamFailure.pdf>

D. Sediment

Sediment and organic matter are naturally entrained in all flowing rivers and when the river finally meets the ocean, a terminal lake, or a human-made reservoir, the sediment load drops to the bottom of the water column and accumulates into massive deltas. At depth the organic material decomposes and methane gas is released into the atmosphere; another waste gas is hydrogen sulfide produced by the metabolism of anaerobic bacteria.

The rate of erosion for the soft sedimentary rocks of the Colorado Plateau is probably exceeded by no other landscape in the natural world. There are over 100 major side canyons at Lake Powell and each canyon has an advancing delta of sediment of course and fine

materials. At depth, turbidity flows of fine sediment advance toward Glen Canyon Dam and accumulate and compact at the fore bay of the facility.

The San Juan River deposits as much sediment into Lake Powell as does the Green and Colorado rivers, combined. Since 1963, the sediment delta of the Colorado River and the San Juan River has advanced 40 miles toward Glen Canyon Dam at a rate of about 5,000 feet per year. The floating marina at Hite was decommissioned in 2003. A new and comprehensive sediment survey of Lake Powell is indeed required to better assess the needs of this EIS, the Basin Study, contingency planning and Interim Guidelines.

Ferrari, 1988: <http://www.riversimulator.org/Resources/USBR/PowellSediment.pdf>

The variances of climate have affected the rates of entrained sediment significantly in the Colorado River basin. For example, data acquired before 1940 indicates the sediment load in the Colorado River was nearly four times greater than today. It is reasonable to expect these high rates of sediment infilling will return. High magnitude floods, such as those that occurred in 1862 and 1884 will mobilize decades of off-channel sediments that have otherwise been segregated from storage in Lake Powell.

Smith, et al., 1960: <http://www.riversimulator.org/Resources/USBR/MeadSediment.pdf>

Water storage and flood control capacities are displaced by sediment fill at over 100 entry points in Lake Powell each month at a rate of about 3,000 acre-feet, or about hundred acre-feet per day. It was predicted in 1961 that sediment fill would reach the level of the river outlet works at GCD by year 2063, and reach the level of the penstocks by year 2113. We realize that these predictions may be premature, but we also realize that sediment levels may increase to pre-1940 levels.

Schultz, 1961: <http://www.riversimulator.org/Resources/USBR/GCDDesign.pdf>

Reclamation currently has no sediment removal plan for Lake Powell or Lake Mead, and fees to pay for the removal of sediment have never been collected from any water user or water agency. A pipeline to carry a slurry of sediment to the Colorado River delta, for example, is not possible because there is no available water for the pipeline. Without a sediment removal plan, the need and purpose of GCD will likely be compromised before the 21st century ends. If the outlet works are impaired by sediment fill, then its ability to deliver water to the lower basin, or for High Flow Experiments, would be impaired. If the outlet works cannot be used to successfully route floods of high magnitude, then the safety of the dam is also at risk. Dam failure would annihilate the cultural values of the river corridor in GCNP (Latham, 1998).

Any environmental management plan for addressing GCD's operations must evaluate both the impacts of sediment from flood flows as well as the long term accumulation into Lake Powell, neither have been address in this DEIS.

F. Water Quality

Last August's spill of polluted water from the Gold King mine into Lake Powell illustrates how a yet to be fully reclaimed mine can pose Colorado River water quality concerns. But what about the thousands of others, many which could too could become mobilized through the types of major flood event as referenced in C above? The presence of these point sources in the affected environment present a threat not only to the aquatic ecology of GCNP's river corridor, but to water users both above and below GCD. The public needs to know how dam operations might be affected by such an event, and the steps taken to mitigate the impacts. Furthermore, should climate change and streamflow reductions bring about a significant lowering of Lake Powell's pool level to at or near dead pool for extended periods of time, as some research findings suggest, what water quality issues or concerns will be presented to the downstream environment in GCNP?

Walters et al., 2015: <http://www.riversimulator.org/Resources/AquaticResearch/MercurySeleniumAccumulationColoradoRiverFoodWebGrandCanyonWalters2015.pdf>

G. Federal Trust Responsibility and Water Justice

The DEIS's interpretation of Federal Trust Responsibility to Indian Nations with regard to the Colorado River generally and Grand Canyon specifically, is wholly inadequate. It represents a complete disregard for the importance of water generally, and the Colorado River specifically, to native people, and thus the Trust Responsibility not to impinge on that cultural heritage.

For many Native Americans of the Colorado River, water is sacred. They see water as more than a source of life, but as life itself; as sentient. Water is a spirit, a medium through which they communicate with The Creator. For them, water responds to the human and non-human environment without prejudice and its hydrological cycle passes from ocean to sky and back again to earth as freshened rain or snow—a never ending journey that nurtures all life. All living beings are part of and not separate from this cycle of water, they observe; so water is not merely a resource to be exploited to solely satisfy human needs, but is a gift to be taken as it is offered. Water is connected to the whole of the landscape, above and below. We cannot respect and protect this element without paying equal attention to the soils, plants and animals that too comprise the web of life interconnected through this cycle.

Native American beliefs and values derived from water have guided and sustained their cultures for millennia; a trust doctrine they received from their ancestors that they must honor in perpetuity. But in the century past, much has been harmed by new beliefs, values and laws that are not their own. Nothing precipitated this damage more than their exclusion from negotiations surrounding the Colorado River Compact of 1922. Despite the existence of a legal trust doctrine with the federal government not to impinge on their abilities to sustain their way of life, values and culture, the Compact generated an emerging body of (water) law wholly foreign to their own, reducing the role of water to subservience that is disconnected from the greater life cycle that it drives. As a result, the watershed now faces scarcity not only for native people, but for all living things that are sacred and joyful.

Other than attempting to mitigate the lack of utilitarian access to Colorado River water, the scope of the Federal Trust Doctrine has been largely ignored by water managers in the basin. As such, extensive cultural desecration has occurred by development of these water resources and the erection of GCD specifically. This has not been address in the DEIS, despite the fact that in August 2014, Secretary Jewell signed Secretarial Order 3335 reaffirming the Interiors commitment to federal trust responsibilities to native people. Nearly a century has passed since the Compact was signed, and half a century since the GCD began operation, its time that these longstanding violations of this Federal Trust Responsibility be both recognized and addressed, both within this DEIS and all aspects of Interior’s management decisions on the Colorado River. Moreover, by giving such old wisdom and teachings a new beginning, Colorado River management as a whole may find ways to transition toward a more resilient and sustainable future for all species that take part in this precious water cycle

H. Relationship to Other Initiatives

In December of 2016 a “contingency planning” document is scheduled to be released by the seven basin states at the same time as the ROD for the LTEMP EIS. At this time it is totally unclear how this plan will change dam operations in the upper basin, and whether the strategy will be effective or not. Additionally, beginning in 2020, the Department of Interior will begin to review and possibly change 2007 Interim Guidelines, and it is unclear how this revised planning document will impact the LTEMP EIS. Moreover, in the next five-years there is a 30% chance the Secretary of Interior will declare shortages for lower basin states and Mexico, and should the losses of surface water continue to downtrend thereafter, it is unclear to us if the ecosystem in Grand Canyon can be recovered, or not.

Tucson Daily Star, 2015: http://tucson.com/news/local/feds-fix-colorado-river-problems-or-we-will/article_7134987f-98d8-5042-a4c2-dfbf9c2edb44.html

Circle of Blue, 2014: <http://www.circleofblue.org/2014/world/jolted-reality-colorado-river-water-managers-plan-persistent-drought/>

I. The Diminishing Returns of System Storage in the Colorado River Basin

When Lake Powell began storing water in 1963, a system surplus of about 3 million acre-feet existed. Today, the system surplus is gone and replaced by system deficit. The recognition of a growing imbalance in the water budget was publicly revealed 70-years ago by Northcutt Ely (former Deputy Secretary of Interior), but heavy lifting to avoid the day of reckoning and to scale-back development never materialized. Ely understood that excessive dam building increases evaporation rates and salinity. To make this untenable situation worse, the self-evident impacts of climate change arrived as predicted in 1957 by Scripps Institute.

Ely, 1946: <http://www.riversimulator.org/Resources/LawOfTheRiver/LightMexicanTreatyElyCRWUA1946.pdf>

Ely 1954: <http://www.riversimulator.org/Resources/Testimony/ColoradoRiverBoard1954ocr.pdf>

Revelle, 1957: <http://www.riversimulator.org/Resources/ClimateDocs/CarbonDioxideExchangeBetweenAtmosphereOceanIncreaseOfAtmosphericCO2Revelle1957.pdf>

This unwillingness of Interior and the States to cope with the natural variance of the Colorado River's hydrocycle is why so many patchwork fixes continue to be presented to the public. Meanwhile, the conservation pools of Lakes Powell and Mead are destined to be exhausted. When hydropower finally sputters or stops, as Ms. Jeka and others have warned, and the public receives final confirmation that Interior and the States' Colorado River experiment was indeed a false promise, what then for the ecological and cultural resources in Grand Canyon National Park? What role will the potential extended implementation of emergency operation guidelines have on resources in Grand Canyon National Park generally, and the goals of the LTEMP specifically? How might crisis-management responses such as the possible suspension of the Endangered Species Act, Antiquities Act, Organic Act and other laws have on the resources in GCNP river corridor? As noted in A and B above, climate change and hydrologic uncertainty combined with existing allocations now present a very real possibility of extended emergency operations within the affected environment for extended periods of time during the 20 year time horizon of the proposed action. The DEIS has failed to address this.

On the whole, the DEIS paints an incomplete picture of the known forces at play on the future operations at GCD, and thus, renders any analysis derived from this mischaracterization of the affected environment, ill-conceived and unfounded.

II. Preferred Alternative Does Not Reflect Need and Purpose

The purpose of the LTEMP is: *"to provide a comprehensive framework for adaptively managing Glen Canyon Dam over the next 20 years consistent with the GCPA and other provisions of applicable federal law."*

The frameworks of all alternatives presented in the EIS, including the Preferred Alternative D, are far too narrow and none comply with the comprehensive intent of this proposed action nor the GCPA.

There are three major components of the ecological processes historically present in Grand Canyon's river corridor that have been extensively disrupted by the construction and operation of GCD: natural hydrograph, natural water temperature regime and loss of sediment and nutrients. Among other impacts, these changes have contributed directly to the loss of the physical material necessary to support pre-dam habitat conditions, disrupting the aquatic food base, contributing to the demise of native species and the further proliferation of non-native species. All of this was well-documented in the first GCD FEIS of 1995. And while those preparing that document were privy to far less information and experimentation history than those preparing this DEIS, its evaluation and recommendations were far more comprehensive and consistent with the purpose and need cited above. The current DEIS dismisses numerous alternatives or elements of alternatives without just cause,

including recommendations from the original EIS that have never been implemented nor determined inappropriate until now.

A. Two More Decades of No Progress

In April 2012, then Interior Secretary Salazar, approved a suite of Desired Future Conditions (DFC) put forth by the Glen Canyon Dam Adaptive Management Program (GCDAMP) to ...“guide the development of recommendations concerning management of Glen Canyon Dam operations and related activities, and dam impacts on Grand Canyon National Park (GCNP) and Glen Canyon National Recreation Area (GCNRA).” Many of these conditions are consistent with those set forth in the Adaptive Management Program’s 2001 Strategic Plan, and in turn date back to 1996 ROD.

This consistency is both encouraging and discouraging, as it illustrate little change in the knowledge as to what’s needed, but also little progress by Interior over the past two decades particularly in the area of the protection and recovery of endangered native fish. Indeed, the only substantive change for endangered fish in Grand Canyon’s Colorado River corridor is an apparent stabilization (but still jeopardy) of humpback chub (HBC) population at the mouth of the Little Colorado River. Although numerous experiments and management changes have been directed toward achieving such a goal over the past 20 years, it’s unclear to what extent any of this has had an impact versus the gradual warming of the water in the mainstem as a result of lower pool levels in Lake Powell brought on by 15 years of below average streamflow. Moreover, this population is one pathogen or one toxic spill into the Little Colorado River away from disappearing as well.

A comprehensive approach to fish recovery over the next two decades, as described by the DFCs approved by Secretary Salazar would include:

- The aquatic food base will sustainably support viable populations of desired species at all trophic levels. Assure that an adequate, diverse, productive aquatic foodbase exists for fish and other aquatic and terrestrial species that depend on those food resources.
- Native fish species and their habitats (including critical habitats) sustainably maintained throughout in each species’ natural ranges in the Colorado River ecosystem (CRE).
- Achieve HBC recovery in accord with the Endangered Species Act (ESA), the HBC comprehensive management plan, and with the assistance of collaborators within and external to the AMP.
- A self-sustaining HBC population in its natural range in the CRE.
- An ecologically appropriate habitat for the HBC in the mainstem.
- A healthy, self-sustaining populations of other remaining native fish with appropriate distribution (flannelmouth sucker, bluehead sucker, speckled dace, so that listing under the ESA is not needed.
- Spawning habitat for HBC in the Lower Little Colorado.
- Establish additional HBC spawning habitat and spawning aggregations within the CRE, where feasible.

- Adequate survival of young-of-year or juvenile HBC that enter the mainstem to maintain reproductive potential of the population and achieve population sizes consistent with recovery goals.

There is no discussion of how any of the alternatives will affect habitat recovery toward meeting these conditions. The preferred alternative is limited to slight changes in flow releases little different from what has been occurring over the past two decades, and in and of itself is incapable of advancing any improvements toward endangered fish recovery within the Colorado River mainstem.

B. Augmentation

For two decades now, Interior has been tasked with demonstrating progress toward endangered native fish recovery and repatriation of extirpated fish species in Grand Canyon's river corridor. Many have argued that this cannot occur until steps are taken to alter the ecological conditions in Grand Canyon's river corridor so that they better mimic those prior to the dam's construction. Such thinking has longtime been behind proposals similar to that recommending dam releases mirror the Colorado River's inflows into Lake Powell. But such a natural flow regime was excluded from consideration because absent sediment augmentation, "...sand transport would be too great to sustain downstream sediment resources". However, it's precisely the lack of these sediment resources that too are a major missing ingredient to mainstream habitat recovery. And a third deficiency is the need for temperature augmentation as suggested in Alternative C. The DEIS dismissed any augmentation outright as deeming them economically unfeasible, thus outside the scope of the DEIS. However, if the 1995 EIS could give attention to such approaches, why are they beyond the scope today?

Most importantly, if no such augmentation is to be provided, the DEIS must demonstrate how the Preferred Alternative can deliver habitat conditions within the Colorado River mainstream consistent with the natural processes and native fish recovery goals of the DEIS stated in Chapter 1, pages 11-12. The fact that the Preferred Alternative may help conserve sediment, have releases timed to certain temperature regimes, may impact the remaining HBC population at the mouth of the Little Colorado River, but no evidence suggest such management practices alone will help recovery in the mainstem. Augmentation must be included in the Preferred Alternative. Otherwise, Interior must revise the stated goals of the LTEMP and the Adaptive Management Program and explain to the public why such changes are consistent with the Grand Canyon Protection Act, Organic Act and Endangered Species Act.

C. Decommissioning

In Chapter 2, page 84 the DEIS states that the decommissioning alternative was excluded because "The alternative would not allow compliance with water delivery requirements including the Law of the River and 2007 Interim Guidelines (Reclamation 2007a,b) and would not comply with other federal requirements and regulations, including the GCPA."

What analysis did Reclamation undertake to illustrate the relative system reliability regarding meeting the Law of the River Compact requirements relative to the the No Action Alternative? How specifically are Lower Basin and Upper Basin water users compromised under the 2007 Interim Guidelines, relative to the No Action Alternative?

The justification of building Glen Canyon Dam to ensure the delivery of water from the upper basin to the lower basin at the Compact Point at Lee's Ferry is irrelevant, because operations at Hoover Dam are fully capable of accurately discharging the downstream allocations to Mexico, the holders of Present Perfected Water Rights, the water rights of the federal reserve lands, and the municipalities of the lower basin states. Additionally, the water accounting procedures of the Long-Range Operating Criteria have proven reliable since its inception in 1970.

P.L. 90-537, 1970: <http://www.usbr.gov/lc/region/pao/pdfiles/opcriter.pdf>

While the GCPA does protect some hydropower generation, current trends in streamflow patterns and Lake Powell pool elevation are reducing the significance of GCD's contribution to the regional energy grid. As a result, the hydropower benefit is not what it was when the GCPA was passed. Similarly, the Marble Canyon trout fishery, while too provided for in the GCPA, is both non-native and unique only in its location. Ecologically this dam-made fishery offers no comparison to the unique assemblage of species that once naturally thrived in Grand Canyon, and who's return is among the main objectives of this DEIS.

To add clarity to the above, the DEIS must employ its CRSS-Riverware modeling using a suit of streamflow scenarios along the lines of Vano et.al. (2013) without incorporating GCD. This relatively simple exercise will provide the public with an objective understanding of the challenges asserted in the DEIS as to why the decommissioning alternative was excluded. In so doing, technicalities, such as the 2007 Interim Guidelines, which themselves will soon be up for revision, should be quantified against the No Action Alternative. A discussion of these results should be provided that weighs the asserted losses against the potential ecological gains both downstream and upstream.

As the past decade of inflows has illustrated, the likelihood of a naturally drained reservoir is no longer something water and energy planners can ignore, especially in light of the environmental damages caused, and recovery options impeded, by GCD's current operating regime. The Preferred Alternative is designed to not significantly alter this regime and improve Grand Canyon's ecological health, while a decommissioning approach can.

The historic outcome of Colorado River development since 1956, when the Colorado River Storage Project Act (CRSP) was authorized by Congress, demonstrates that construction and maintenance of GCD is a burden to public resources. De-authorizing the facility is a viable alternative and the reward is surface water of better quality and quantity, the addition of 500 miles of critical habitat for endangered species, and the satisfaction of returning some respect and dignity to the gift of the Colorado River and GCNP.

D. Glen Canyon Dam's Lifespan

Glen Canyon Dam cannot operate forever, and the DEIS must state what steps the proposed action will affect one way or the other how its long-term operational viability may be affected during the 20-year timeframe of the proposed action. All reasonably supported hydrologic and catastrophic scenarios over a century time-window must be explored and made known to the public in conjunction with evaluating alternatives. If climate change has taught us anything, it's that such long-range planning is critical now, something that Reclamation has been slow to recognize. Employing foresight to articulate the potential events of the future are critical to developing actions now that ensure society is prepared to manage them. This DEIS does none of this, though its Introduction contends the GCD is a critical part of the Colorado River water delivery infrastructure (LR, CBD, RRFW scoping comments LTEMP EIS, 2012, p. 25).

E. Lost in the Fray

We recognize that there will be many hydrologic challenges for water managers to contend with in the very near future related specifically to over-consumption of water resources and a persistent drying trend. These looming problems will affect dam operations throughout the whole of the Colorado River basin, and planning by the states and federal governments is yet insufficient to effectively mitigate these challenges in a prudent and reasonable manner.

Letter to Sec. Jewell, 2015: <http://www.livingrivers.org/pdfs/LetterToJewell13October2015Final.pdf>

These shortfalls in the management of the Colorado River basin as a whole indicate that emergency conditions may prevail more often than not through the course of the current LTEMP timeframe. As a result, the Preferred Alternative, and the LTEMP as a whole, will lose relevance. Because of these pending uncertainties, the public and the Grand Canyon river ecosystem deserves a much more vigorous and flexible action plan than any of the seven alternatives given consideration in the DEIS. This must include how perspective alternatives will deliver on each of the recovery goals during the proposed action's 20 year time horizon and under all conceivable operating and hydrologic conditions. With limited progress on habitat recovery since the 1996 ROD, the public needs to know how the LTEMP will change this over the next two decades.

III. Respond to the Institutional Challenges

The institutional processes associated with Colorado River management in Grand Canyon is faulty from both the bottom-up and the top-down. From the bottom lies an AMP process that is guided by the whims of special interest, while the resource itself continues to suffer. From the top there is no clear mandate of what the real objectives are or should be, especially over the medium- and long-term. The ecosystem in GCNP is not WAPA's, trout fishermen's nor river runner's playground to carve out and defend as they please. Nor is it Glen Canyon Monitoring and Research Center's scientific playground to re-tinker with trivial actions from a body beholden to the chains of these special interests. This is a world renowned riverine resource for which Interior, guided by the most rigorous interpretation of the spirit of those

laws governing the National Park System, must step forward and act in the public's interest with the best independent scientific perspective available. If these special interest groups become frustrated with Interior's actions, they can challenge them in the courts and the court of public opinion. Why must Grand Canyon's ecology consistently be the principle plaintiff seeking remedy. There is no substitute for the ecological supremacy of a Grand Canyon river corridor once again receiving the natural processes blocked a half-century ago. Such recovery lies at the heart of the mission of the National Park Service, the ESA and GCPA—thus the LTEMP must reflect this.

Moreover, lack of leadership by Interior has exacerbated a host of problems not only in Grand Canyon, but throughout the basin:

- Resource managers have failed to make significant progress to remove jeopardy for endangered species.
- Water managers of the Colorado River have knowingly created a situation of over-consumption of a finite and diminishing resource.
- The water conservation that does take place is quickly transferred to new water projects and serves to harden the demand more than it already is.
- 20th century water managers failed to adapt to the wide variances and extremes of the natural hydrocycle.
- Resource managers have failed to improve water quality.
- Resource managers have failed to deal with the problem of entrained sediment.
- 21st century water managers do not have the necessary time and resources to adapt to the drying impacts of climate change.
- Water managers have failed to manage critical groundwater resources appropriately.

As such, there's urgent need for new leadership, and new avenues for administering the its will and mandate. Strategic Plans and Desirable Future Conditions are meaningless if the GCDAMP demonstrates little to no results in the river corridor to remove jeopardy from endangered fish, which so far has been the case. Meaningless too is the Preferred Alternative in the DEIS, as it illustrates no change in this dynamic.

On top of this, the complexity of water issues in the basin have effectively taken the common citizen out of the process. The issues, policy, laws and science have become too burdensome, too one-sided, and has created a situation of bewilderment or malaise. It has been suggested before that an independent commission for the Colorado River basin should be established. The suite of issues affecting the basin, of which GCD and the LTEMP are a critical part, have reached a point in history where it is quite possible that Interior is not the best choice in directing the long-term management proposal for the Colorado River basin, or any its key parts, such as GCD and its impacts on Grand Canyon National Park. Certainly the leadership so far provided has steered water users in the basin and the basin's unique ecological and cultural resources further toward crisis. And while climate change may be accelerating this, Interior has been guiding the downward trajectory for decades.

As such, the DEIS should have addressed the constraints impairing Interior's ability to address the complex challenges facing the Grand Canyon River ecosystem and how this is derived

from the competing challenges facing Colorado River management as a whole. Further, a key component of any LTEMP alternative should therefore be mechanisms to give sufficient funding and authority to an independent commission that can provide oversight and ensure comprehensive independent analysis of what must be accomplished and in a reasonable time-frame for the benefit of Grand Canyon and the basin as a whole.

IV. Making Up for the Lost Timeline of the LTEP & LTEMP

It's beyond time for Interior to demonstrate vision for what can and should be done to address the water management through Grand Canyon. It's been twenty years already, and the Preferred Alternative only offers more of the same. As summarized below, the amount of foot-dragging and delay, on just this single component of Colorado River management, is disturbing. Interior must abandon its policy of tinkering with knobs and switches and defending these actions in court by explaining how the public should not expect them to achieve better results.

- November 8, 2005 - The Center for Biological Diversity and Living Rivers (and others) submitted a 60-day Notice to the Department of Interior to initiate formal consultation with the U.S. Fish and Wildlife Service concerning insufficient progress to recover endangered species in the Colorado River below GCD.

CBD Notice, 2005: http://www.riversimulator.org/Resources/Legal/CBD_LR_Notice.pdf

- November 6, 2006 - In a Federal Register notice (71 FR 64982-64983) the Department of Interior, acting through the Bureau of Reclamation (Reclamation), provided notice of its intent to prepare an Environmental Impact Statement (EIS) and conduct public scoping meetings for the adoption of a Long-Term Experimental Plan (LTEP) for the operation of GCD and other associated management activities.

FRN, 2006: <https://www.federalregister.gov/articles/2006/11/06/E6-18575/glen-canyon-dam-adaptive-management-work-group-amwg>

- September 12, 2007 - Grand Canyon Trust submits a 60-day Notice to the Department of Interior for procedural and substantive violations of the Endangered Species Act.

GCT Notice, 2007: <http://www.riversimulator.org/Resources/Legal/GCT/60daySASfnoticeGCT.pdf>

- November 13, 2007 - U.S. Fish and Wildlife Service receives request for formal consultation from the Bureau of Reclamation, Upper Colorado Regional Director.
- December 13, 2012 - Record of Decision (ROD) signed for Colorado River Interim Guidelines for Coordinated Operations for Lake Powell and Lake Mead (Interim Guidelines).

ROD, 2007: <http://www.usbr.gov/lc/region/programs/strategies/RecordofDecision.pdf>

- February 12, 2008 - The Federal Register (73 FR 8062) announced the LTEP EIS was suspended until completion of environmental compliance for a five-year plan of experimental flows, beginning in 2008. The plan included a high-flow events and yearly fall steady flows to be conducted in September and October of each year until 2012.

FRN, 2008: <https://www.gpo.gov/fdsys/granule/FR-2008-02-12/E8-2534>

- February 27, 2008 - Final Biological Opinion for Operations at Glen Canyon Dam is issued by the U.S. Fish and Wildlife.

GCD BiOp, 2008: <https://www.usbr.gov/uc/envdocs/bo/FinalGCDBO2-26-08.pdf>

- February 29, 2008 - Finding of No Significant Impact for Proposed Experimental Releases from Glen Canyon Dam, 2008 to 2012. The Department of the Interior, acting through Reclamation, proposed a series of experimental releases of water from GCD to help native fish, particularly the endangered humpback chub, and conserve fine sediment in the Colorado River corridor in GCNP.

FONSI, 2008: <http://www.usbr.gov/uc/envdocs/ea/gc/2008hfe/FONSI.pdf>

- December 10, 2009 - Secretary Salazar announced the development of the LTEMP EIS. The Department's decision to develop the LTEMP is a component of its efforts to continue to comply with the ongoing requirements and obligations established by the Grand Canyon Protection Act of 1992. The purpose of the proposed LTEMP is to utilize current, and develop additional scientific information, to better inform Departmental decisions and to operate the dam in such a manner as to improve and protect important downstream resources. Given that it has been 15 years since completion of the 1996 ROD on the operation of GCD, the Department will study new information developed through the GCDAMP, including information on climate change, so as to more fully inform future decisions regarding the operation of GCD and other management and experimental actions.

FRN, 2011: http://ltempeis.anl.gov/documents/docs/Notice_of_Intent_July_6_2011FR.pdf

- January 31, 2012 - Public Scoping period for LTEMP EIS concludes.
- September 30, 2012 - Expiration of the Five-year Experimental Releases EA.
- January 8, 2016 - Release of the LTEMP Draft EIS.

FRN, 2016: http://ltempeis.anl.gov/documents/docs/LTEMP_DEIS_NOA.pdf

- December 31, 2016 - Assumed date of LTEMP Record of Decision.
- December 31, 2016 - Assumed date of "Contingency Planning" document by the seven states.
- December 31, 2020 - the Secretary shall initiate a formal review of Interim Guidelines.
- December 31, 2025 - Interim Guidelines expire.
- December 31, 2036 - LTEMP Record of Decision expires

Now, after more than ten years, countless meetings, submissions, studies and delays, a Preferred Alternative is being advanced that offers no substantive change to the management priorities for habitat recovery in Grand Canyon and thus little hope of achieving it.

V. Conclusion

For the 20th century we observe that the Colorado River basin produced a higher-than-normal yield of water and did not suffer from events of maximum drought and flood. During

that century humans prospered by totally controlling the water resources of the Colorado River with an ideology of total use for greater wealth. For the 21st century, this ideology is unraveling and the command over this water is slowly returning back to Nature. The LTEMP, while recognizing GCD key role in the system's infrastructure, failed to address this 21st Century reality, nor embrace 21st century planning efforts that are both more holistic in scope and embracing of the long-term forces at play within the surrounding social and ecological environment. So far, the only real result of the LTEMP process has been demonstrating to the public that now, more than ever, some new leadership is required to manage this complex human-ecological system, as Interior has yet demonstrated the interest or foresight to even properly define it, much less propose and evaluate alternatives to managing it. It's past time for Interior's 19th Century ideology of conquering the Colorado River to be abandoned, as the futility is both tiresome and socially and economically dangerous. And in the meantime, valuable ecological and cultural resources continue to be squandered in the process.

Sincerely yours,

John Weisheit
Co-founder of Living Rivers
Colorado Riverkeeper

Robin Silver
Co-founder of Center for Biological Diversity

Tom Martin
Co-founder of River Runners for Wilderness

Gary Wockner
Co-founder of Save the Colorado
Poudre Waterkeeper