



November 14, 2016

**Glen Canyon Dam LTEMP FEIS
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Transmitted electronically to:

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Also, sent via snail mail to the address above.

Re: Save The Colorado's Comments on the Glen Canyon Dam LTEMP FEIS

Dear Mr. Billerbeck and Ms. Grantz,

Thank you for the opportunity to provide comments on the Glen Canyon Dam LTEMP FEIS. We find several shortcomings in the FEIS that must be addressed in order for the Department of the Interior to comply with federal laws including the National Environmental Policy Act and Endangered Species Act.

We give you five specific sections of comment:

1. The FEIS fails to take climate change seriously and does not represent the most current and best available science on climate change and its likely impacts on the Colorado River.
2. The FEIS does not include the most current economic analysis of the impact of removing hydropower at Glen Canyon Dam.
3. The FEIS fails to use the most current science to adequately consider, account for, and mitigate climate change emissions from operations of Glen Canyon Dam.
4. By failing to account for the climate change impacts on the Colorado River and from the operation of Glen Canyon Dam and the most current economic analysis of the impact of removing hydropower at Glen Canyon Dam, the FEIS fails to take the required hard look at the impacts of the LTEMP and alternatives proposed.
5. By failing to include an alternative that evaluated decommissioning Glen Canyon Dam, the FEIS fails to consider an adequate range of alternatives that meet the purpose, needs, and objectives of the proposed project.

These comments supplement our letter we sent you on May 9, 2016¹.

1: The FEIS fails to take climate change seriously and does not represent the most current and best available science on climate change and its likely impacts on the Colorado River.

Over the last few months, new science and information has come forward that accelerates our concern about your inadequate FEIS and its attempt to grapple with the likely impacts of climate change on the volume of flow in the Colorado River. In your response to our comment letter about climate change, you stated:

“The LTEMP utilized the best available science provided through the peer reviewed Basin Study (Reclamation 2012) regarding climate change projections in the Colorado River. The hydrological traces generated for the Basin Study were utilized as described in Section 4.16.1 and Appendix C.²” (Appendix Q, 2.14)

Your response is not correct for the following reasons:

- First, a peer-reviewed scientific article titled, “Relative impacts of mitigation, temperature, and precipitation on 21st-century megadrought risk in the American Southwest,³” was released on October 5, 2016. This article paints a much more dire picture than does the 2012 Basin Study, and puts the risk of “megadrought” between 70% and 99%. Such a megadrought would impose considerably higher decreases in streamflows than predicted in the 2012 Basin Study in your FEIS.
- Second, a group of pre-eminent scientists calling themselves the “Colorado River Research Group⁴” issued a report in October of 2016, titled, “Climate Change and the Colorado River: What We Already Know⁵,” specifically addressing your response to our comment letter. The report states:

“The climate change scenarios utilized in some of the Bureau of Reclamation’s Basin Study analyses suggest an average streamflow decline of roughly 9 percent by 2060. This value was compiled from a suite of 112 projections derived from 16 climate models driven by 3 greenhouse gas emissions scenarios (high, medium and low). Utilizing climate change hydrology in the Basin Study’s scenario planning was a major advance for Reclamation, and an invaluable first step in understanding the challenges of water management in an era of climate change. More recent, but not necessarily more accurate, climate models suggest the possibility of small increases in flow. However, with 16 years of the 21st century already passed, there is now considerable evidence

¹ <http://www.savethecolorado.org/blog/wp-content/uploads/2016/05/Comments-LTEMP-DEIS-Save-The-Colorado-5-9-2016.pdf>

² http://ltempeis.anl.gov/documents/final-eis/vol3/Appendix_Q-Comments_and_Responses.pdf

³ <http://advances.sciencemag.org/content/2/10/e1600873.full>

⁴ <http://www.coloradoriverresearchgroup.org/>

⁵ http://www.coloradoriverresearchgroup.org/uploads/4/2/3/6/42362959/crrg_climate_change.pdf

that a 9 percent decline is likely an optimistic scenario. Streamflows thus far in the 21st century are already down roughly 15% from the previous century, significantly more than the median decline projected in the Basin Study for 2060. Reductions in precipitation do not fully explain these losses, leaving higher temperatures as the likely culprit behind the remaining declines. With far warmer temperatures expected as the century unfolds, this does not bode well for future runoff.

If there is a point of widespread agreement regarding future runoff volumes, it is that it is dangerous to focus too heavily on a mean estimate of flow changes—9 percent or otherwise; it is the range of plausible flow scenarios that is critically important. Likewise, the enhanced probability for extreme events, such as decades-long megadroughts, associated with a warming planet must be considered jointly along with any changes in the overall trajectory of runoff. (page 2 – 3, underline added)

- Third, a paper in review was presented at the “Law of the Colorado River” conference in Las Vegas in February of 2016 by two of the scientists in the Colorado River Research Group, Brad Udall and Jonathan Overpeck. That paper predicts a range of outcomes, some with dramatically decreased runoff in the Colorado River basin as compared to the 2012 Basin Study. Mr. Overpeck stated in his presentation:
 - “3) Scientists and water managers alike, however, should be careful not to assume the currently estimated “worst case” drought scenarios will remain so for long. As climate science has advanced in the Southwest, there have been a steady progression of new results that imply that today’s “worst-case” drought scenario is tomorrow’s second-worst case scenario. Water managers should pay particular attention to the emerging science that has been highlighted in the testimony above.⁶” (page 192)
- Fourth, Mr. Overpeck actively takes to social media to express his scientific research and the outcomes and policies that should be implemented from it. While some water managers (such as the Bureau of Reclamation, and as such expressed in your FEIS) believe that the climate change scenarios in the FEIS are adequate, on Oct. 22, 2016, Mr. Overpeck tweeted⁷:

⁶ <http://www.savethecolorado.org/blog/wp-content/uploads/2016/08/Law-of-the-Colorado-River-Course-Materials.pdf.pdf>

⁷ <https://twitter.com/TucsonPeck/status/789937940172460032>



- Finally, the State of Colorado, Water Conservation Board, has funded and is moving forward with the “Colorado River Risk Study.”⁸ Although the study is not yet complete, it highlights the risk that Lake Powell will drop below ‘power pool’ which is the lake level at which the hydroelectric facility will stop working. The “Risk Study” is a central part of the State of Colorado’s management of its allotment of Colorado River water, and that the State of Colorado is taking this so seriously means that the potential for Lake Powell to drain is very real. The “goal” of the “Risk Study” is to “Identify actions that can reduce the risk of losing power production”⁹ at Glen Canyon Dam. Further, a news report about the study, titled: “Study: Drought like 2000-2006 would empty Lake Powell,”¹⁰ discusses many public statements by Mr. Eric Kuhn, who is the Director of the Colorado River District and is in charge of the study for the State of Colorado:

“If we were to have another 2000-2006 drought, with where our starting conditions are today, we would basically empty Lake Powell,” Kuhn told the board of directors of the river district last month in an update on the study.

Further, Mr. Kuhn stated, “This is what I call the ‘sticker shock,’” Kuhn said of those figures. “Basically, what we’re saying is if we were to have, under today’s conditions, one of these three droughts, we would go below our target of 3,525 feet.”

Finally, Mr. Kuhn stated, “I haven’t shown the climate change hydrology because it just scares everybody,” Kuhn said. “This is the recent hydrology.”

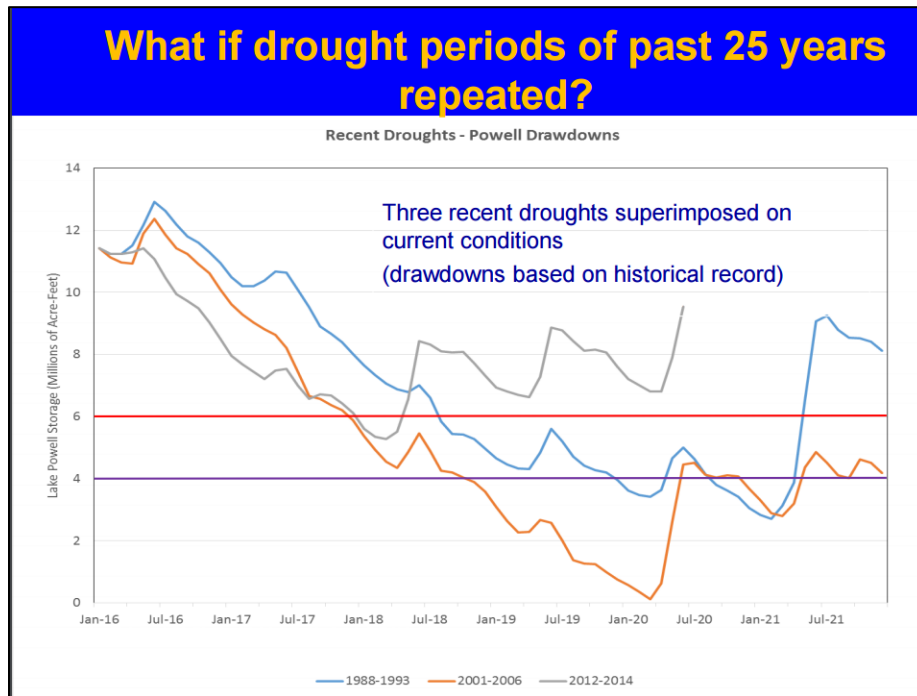
A hint at that climate change hydrology is revealed in the graph below, which is slide 13 in Mr. Kuhn’s presentation that he gave at the public meeting from which this newspaper story was generated. In the graph, the hydropower operations at Glen Canyon Dam cease to operate if any of the three recent drought scenarios are repeated. The red horizontal line is approximately “power pool” at Lake Powell, and

⁸ <http://www.coloradoriverdistrict.org/wp-content/uploads/2016/10/2016-09-16-seminar-kuhn.pdf>

⁹ <http://www.coloradoriverdistrict.org/wp-content/uploads/2016/10/2016-09-16-seminar-kuhn.pdf> (slide 2)

¹⁰ <http://www.aspendailynews.com/section/home/172183>

when storage levels drop below that line – as they do in all three modeled drought scenarios – the hydroelectric turbines stop spinning:



Adding to this presentation and newspaper article, on September 16, 2016, Mr. Kuhn gave a written version of the interim report of the “Colorado River Risk Study” to the board of directors of the Colorado River Water Conservation District¹¹. Specifically addressing how real the threat is of drought and climate change draining Lake Powell, Mr. Kuhn writes:

“4. Is the threat of draining Lake Powell real or is it just a paper threat?”

Answer: This is a difficult question, but I believe the best answer is the threat is very real. HOWEVER, the risk is relatively low. The study shows that at today’s development levels two conditions would have to occur before there is a real threat that we would drain Lake Powell and trigger the need for a significant amount of demand management. First, we need a drought the magnitude of 2000-2005 or 1952-1956. AND second, the initial storage levels in Lake Powell need to be at or below 13-14 MAF. Based on historical hydrology, the risk of both of these occurring is relatively low. However, I need to point out that because Lake Powell storage is currently only 13 MAF, today we are clearly at an elevated risk. Further, some hydrologists have pointed out that based on what has actually happened since 2000, even the 1988-2012 “stress test” hydrology may be too optimistic. The 1988-2012 period had a mean natural flow at Lee

¹¹ <http://www.coloradomesa.edu/water-center/documents/JOINT%20WEST%20SLOPE%20RISK%20STUDY%2009-13-16.pdf>

Ferry of 13.3 million-acre feet per year. The estimated mean natural flow at Lee Ferry for 2000-2016 is only 12.5 MAF per year. NOTE, the annual natural flows for 2014-2016 are still preliminary estimates. If the hydrologic conditions we've experienced in the Colorado River Basin since 2000 continue on into the future, the risk of draining Lake Powell is substantial." (page 12, underline added)

Additionally, in the "key findings" of Mr. Kuhn's 9/16/2016 report, he writes:

"In the most extreme drought scenarios, even after drought operations and additional demand management in the Lower Basin, the shortfall may be too large to meet with demand management programs, suggesting the need for discussions now about the necessary tradeoffs and alternative strategies to meet worst case scenarios." (page 1)

In our comment letter sent to you on May 9th, we said that you must consider dam decommissioning and removal because climate change could make the system unworkable as climate change would not allow enough water to flow downstream to Lake Powell to keep the hydropower plant operating. You responded by saying that you relied on the 2012 Basin Study and its climate change scenarios, and that under those scenarios, there would be enough water to keep Lake Powell above 'power pool.' Your analysis is incorrect. You must consider a full range of climate change scenarios, including a 99% likelihood of megadrought. You must heed the statements of the Colorado River Research Group which states that the 2012 Basin Study does not reflect the full range of likely outcomes of climate change on streamflows.

Additionally, because climate change could reduce flows in the river dramatically, as compared to what was predicted in the 2012 Colorado River Basin Study, you must consider an alternative in which the hydropower plant at Glen Canyon Dam no longer operates. This alternative is very real, so real that the State of Colorado is studying and planning for the risk of it happening, and trying to identify actions to keep it from happening. Further, Mr. Kuhn's statements that his "Risk Study" will not reveal to the public the "climate change hydrology because it just scares everybody" implores the Department of Interior to reveal that exact information in order to serve the public's interest as well as comply with the National Environmental Policy Act. Dam decommissioning and removal is not just a viable alternative, but may be only responsible and prudent alternative, given the likelihood of climate change as noted by the scientific community in the Colorado River basin. Dam decommissioning and removal is an alternative that must be considered in the FEIS. Failure to adequately analyze climate change and to address it in the EIS process violates the National Environmental Policy Act and Endangered Species Act.

2: The FEIS does not include the most current economic analysis of the impact of removing hydropower at Glen Canyon Dam.

Over the last few years, a number of policymakers have made erroneous statements about the impact on electric rates that would be caused if the hydroelectric plant at Glen Canyon Dam were to stop operating. Much of this rhetoric has been ill-informed speculation. To address this lack of economics and science, the Glen Canyon Institute commissioned and released a study in

2016 (after the release of your LTEMP DEIS), titled, “THE IMPACT OF THE LOSS OF ELECTRIC GENERATION AT GLEN CANYON DAM¹²” (“Power Study”) led by Dr. Thomas Power, former Chair of the Economics Department at the University of Montana. The Power Study bursts the bubble of the myth about the role of hydropower at Glen Canyon Dam and reaches an important conclusion:

“The study concludes that, if Glen Canyon Dam stopped generating hydropower, it would have a negligible impact on the western power grid, would raise electric rates by an average of 8 cents per month for residential customers of hydropower, and could save tens of millions of dollars each year in taxpayer subsidies and water lost to system inefficiencies.” (page 1, website)

We insert this study and its conclusions into the public record so that the Department of the Interior can rethink its operational objectives at Glen Canyon Dam. The “Public Interest” would not be harmed by the decommissioning and removal of Glen Canyon Dam and its hydroelectric capacity. Further, the public interest could be supported because money could be saved. The report concludes:

“A discontinuation of Glen Canyon Dam operations could have offsetting benefits of approximately \$74.8 million annually, including savings of \$34.9 million in management costs and potential earnings of as much as \$39.8 million annually due to increased hydropower at Hoover Dam and conservation of water that would have otherwise seeped into the banks of Lake Powell.” (page 1, website)

The LTEMP FEIS for Glen Canyon Dam fails to comply with NEPA guidelines for considering the loss of hydroelectric power at Glen Canyon Dam. The LTEMP FEIS for Glen Canyon Dam fails to consider a full range of alternatives – including dam removal. Failure to use accurate science and economics in analyzing the alternatives violates the National Environmental Policy Act and Endangered Species Act.

3. The FEIS fails to use the most current science to adequately consider, account for, and mitigate climate change emissions and methane from operations of Glen Canyon Dam.

You do not adequately count methane emissions from dam operations, nor do you consider a full range of alternatives that would mitigate, avoid, or offset methane emissions from dam operations.

In 1993, the first scientific paper¹³ was published indicating that dams and reservoirs emitted greenhouse gases, namely methane, as a byproduct of hydropower electricity generation. That research set off a long chain of subsequent scientific inquiry, some of which was headed by American scientist Phillip Fearnside¹⁴ whose groundbreaking 1996 publication¹⁵ ignited a

¹² <http://www.powereconconsulting.com/the-impact-of-the-loss-of-electric-generation-at-glen-canyon-dam/>

¹³ Gagnon L, Chamberland A (1993). Emissions from hydroelectric reservoirs and comparison of hydroelectric, natural gas and oil. *Ambio* 22:568-569

¹⁴ <https://www.internationalrivers.org/blogs/433-12>

controversy in the international hydropower industry about significant methane emissions in tropical environments. Subsequent publications indicated that not only were methane emissions significant, hydroelectric dams/reservoirs could generate even greater greenhouse gas equivalents than coal-fired powerplants in tropical environments¹⁶.

The international scientific community continued to investigate and publish on this topic throughout the 1990s and early 2000's. In 2006, the Intergovernmental Panel on Climate Change (IPCC) published "guidelines" for estimating some of the methane emissions from hydropower and reservoirs¹⁷. These guidelines were an important starting point for IPCC research and negotiations but have mostly been ignored by every country in the world as the Kyoto Protocol was implemented¹⁸. Worse, the same Kyoto Protocol called hydropower "clean" and included it in their "Clean Development Mechanism¹⁹" toolkit that was carried forward into COP 21.

In the early 2000's, after methane emissions were estimated in tropical environment as being very significant, measurements were also taken at a few reservoirs in more temperate environments in Canada, Europe, and the United States. That research accelerated from 2010 to the present as scientists began to better understand how, where, and when methane and other greenhouse gases were generated and emitted from reservoirs, dam spillways, hydropower infrastructure, and dam-impacted river reaches downstream. In recent years, scientists (including those at the EPA) have also developed improved methods and technologies to better measure the emissions.

- A 2013 study in Environmental Science and Technology better articulated the concept that reservoirs in temperate climates in Europe had methane "hot spots" and better measured those methane emissions²⁰.
- A 2012 study in Washington was able to measure how certain dam operations "dramatically" increased methane emissions²¹.
- A 2014 study indicated that a reservoir in the Midwestern U.S. had significantly higher methane emissions than were previously estimated²².

At the same time that these U.S. studies were published, estimates of methane emissions from around the world were also published indicating that worldwide emissions may be dramatically

¹⁵ Fearnside PM (1996). Hydroelectric dams in Brazilian Amazonia: response to Rosa, Schaeffer and dos Santos. Environ Conserv 23:105-108.

¹⁶ See Fearnside references: <https://www.internationalrivers.org/resources/philip-fearnside-comments-on-jirau-dam-brazil-7471>

¹⁷ http://www.ipcc-nggip.iges.or.jp/public/2006gl/pdf/4_Volume4/V4_p_Ap3_WetlandsCH4.pdf

¹⁸ <http://www.ecowatch.com/hydropower-will-undermine-cop21-as-false-solution-to-climate-change-1882117292.html>

¹⁹ http://unfccc.int/kyoto_protocol/mechanisms/clean_development_mechanism/items/2718.php

²⁰ <http://pubs.acs.org/doi/abs/10.1021/es4003907>

²¹ <https://www.sciencedaily.com/releases/2012/08/120808081420.htm>

²² <http://pubs.acs.org/doi/pdf/10.1021/es501871g>

higher than previously estimated²³. In 2016, researchers from the U.S. Environmental Protection Agency published results based on new methodologies indicating that a Midwestern U.S. reservoir may emit as much methane as reservoirs in tropical environments. The study, titled, “Estimates of reservoir methane emissions based on a spatially balanced probabilistic-survey²⁴,” summarizes:

“Several literature reviews suggest that total CH₄ emission rates from temperate reservoirs are typically less than 1 mg CH₄ m² h⁻¹ (Barros et al. 2011; Bastviken et al. 2011). The total CH₄ emission rate reported here (8.3 ± 2.2 mg CH₄ m² h⁻¹) is well above that value and is in the range more frequently reported for tropical reservoirs. However, recent studies that included hot spots in temperate zone reservoirs have reported emission rates ranging from 4 mg CH₄ m² h⁻¹ to 13 mg CH₄ m² h⁻¹ (DeSontro et al. 2010; Maeck et al. 2013; Beaulieu et al. 2014) (excluding CH₄ released during passage through the dam), suggesting that emissions from temperate systems may have been systematically underestimated.” (page 11, underline added)

The same EPA researchers, and a host of other international scientists, published a paper in *Bioscience* in October 2016²⁵ of “synthesis findings” all of the applicable studies (to date), which was funded by the U.S. Army Corps of Engineers, the U.S. Environmental Protection Agency, and the National Science Foundation.

Among other conclusions, the article states:

“When CH₄, CO₂, and N₂O emissions are combined, our synthesis suggests that reservoir water surfaces contribute 0.8 Pg CO₂ equivalents per year over a 100-year time span (fifth and ninety-fifth confidence interval: 0.5–1.2 Pg CO₂ equivalents per year), or approximately 1.5% of the global anthropogenic CO₂-equivalent emissions from CO₂, CH₄, and N₂O reported by the IPCC (table 1; Ciais et al. 2013) and 1.3% of global anthropogenic CO₂-equivalent emissions from well mixed GHGs overall (Myhre et al. 2013). Therefore, we argue for inclusion of GHG fluxes from reservoir surfaces in future IPCC budgets and other inventories of anthropogenic GHG emissions.” (page 12-13)

Finally, on Sept 16, 2016, the first ever estimate of GHGs from Glen Canyon Dam operations was published in the peer-reviewed scientific journal PLOS²⁶. The study estimated that operations at Glen Canyon Dam created 415 kg CO₂e/MWh²⁷ which is roughly equal to the

²³

<https://sustainability.water.ca.gov/documents/18/3407432/Uncertainties+of+carbon+emission+from+hydroelectric.pdf>

²⁴ <http://onlinelibrary.wiley.com/doi/10.1002/Ino.10284/pdf>

²⁵ http://www.savethecolorado.org/blog/wp-content/uploads/2016/10/BioScience-2016-Deemer-biosci_biw117.pdf

²⁶ <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0161947#pone-0161947-g001>

²⁷ <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0161947#pone-0161947-g001> (see Table 1, line 307, column Q)

lower values created by natural gas powerplants²⁸. Further, this estimate is in the process of being refined because it does not include a full “life cycle analysis” of emissions and does not include emissions related to mud flats and sediment ponds.

The National Environmental Policy Act requires that the Department of Interior take a “hard look” at all direct, indirect, and cumulative impacts associated with the proposed alternatives in the LTEMP FEIS. The National Park Service’s guidance²⁹ states:

“NEPA reviews must take a “hard look” at impacts that alternatives under consideration would have on the human environment if implemented. This means that there must be evidence that the NPS considered all foreseeable direct, indirect, and cumulative impacts, used sound science and best available information, and made a logical, rational connection between the facts presented and the conclusions drawn.” (page 69)

Although the LTEMP FEIS purports to analyze the environmental impacts of operating Glen Canyon Dam and its impact on the Colorado River ecosystem, the FEIS fails to analyze the methane and greenhouse gas emissions of any alternative.

Further, in August of 2016 (after the release of your LTEMP DEIS), the Whitehouse Council on Environmental Quality issued its “Final Guidance on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change³⁰” which states:

“This final guidance provides a framework for agencies to consider both the effects of a proposed action on climate change, as indicated by its estimated greenhouse gas emissions, and the effects of climate change on a proposed action. The final guidance applies to all types of proposed Federal agency actions that are subject to NEPA analysis and guides agencies on how to address the greenhouse gas emissions from Federal actions and the effects of climate change on their proposed actions within the existing NEPA regulatory framework.” (website)

And also states:

“Counsels agencies to use the information developed during the NEPA review to consider alternatives that would make the actions and affected communities more resilient to the effects of a changing climate³¹,” (page 5)

The LTEMP FEIS for Glen Canyon Dam fails to comply with NEPA guidelines and with the CEQ guidance for estimating or addressing greenhouse gas emissions. The LTEMP FEIS for Glen Canyon Dam fails to consider a full range of alternatives – including dam removal – to mitigate, avoid, or offset greenhouse gas emissions fails to comply with NEPA. Failure to analyze these

²⁸ <http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0161947#pone-0161947-g001>

(see Figure 2)

²⁹ https://www.nps.gov/orgs/1812/upload/NPS_NEPAHandbook_Final.pdf

³⁰ https://ceq.doe.gov/current_developments/ceq_guidance_nepa-ghg-climate_final_guidance.html

³¹ https://www.whitehouse.gov/sites/whitehouse.gov/files/documents/nepa_final_ghg_guidance.pdf

greenhouse gas emission and address them in the EIS process violates the National Environmental Policy Act and Endangered Species Act.

4. The FEIS fails to take the required hard look at the climate change and economic impacts of the LTEMP and alternatives proposed.

The fundamental requirement imposed on a Federal agency by NEPA is that it take a hard look at the environmental consequences of its proposed action. *Lands Council v. Forester of Region One of the United States Forest Serv.*, 395 F.3d 1019, 1026-27 (9th Cir. 2005). "NEPA requires that a federal agency consider every significant aspect of the environmental impact of a proposed action . . . [and] inform the public that it has indeed considered environmental concerns in its decisionmaking process." *Earth Island Inst. v. United States Forest Serv.*, 351 F.3d 1291, 1300 (9th Cir. 2003) (internal quotation marks omitted).

To ensure this hard look requirement can be met "NEPA requires that the Environmental Impact Statement contain high-quality information and accurate scientific analysis." *Lands Council*, 395 F.3d at 1031 (9th Cir. 2005) (citing 40 C.F.R. § 1500.1(b)). It is essential that the agency incorporate high quality and accurate information to ensure that the decisionmaker and the public can make an informed comparison of the alternatives. See *Natural Res. Defense Council v. United States Forest Serv.*, 421 F.3d 797, 811 (9th Cir. 2005). Application of these principles and requirements here reveals that the Department of the Interior has not considered and presented the high quality information and accurate scientific analysis necessary to take the required "hard look" at the environmental consequences of the LTEMP.

First, as explained in Part 1 above, recent and ongoing study of the impacts of climate change on the Colorado River strongly supports a conclusion that the continued, long-term operation of Glen Canyon Dam for hydropower and water storage and distribution purposes may not be viable. Recent scientific analyses, which are presented above but not considered in the LTEMP FEIS, indicate that climate change impacts will reduce the flows to such a level that there is a substantial risk of draining Lake Powell below the "power pool." Such a scenario would significantly disrupt the feasibility of most if not all of the alternatives presented in the LTEMP FEIS. Yet the LTEMP FEIS fails to include and consider this recently developed information. Without consideration of the most current information on the impacts of climate change on the Colorado River, the LTEMP FEIS does not present an accurate scientific analysis of the alternatives. And as explained above, simply relying on the 2012 Basin Study as the basis for evaluating climate change impacts on the operation of Glen Canyon Dam is insufficient. This is inadequate and does not comply with NEPA.

Second, as explained in Part 2 above, the LTEMP FEIS does not contain a complete, accurate economic analysis of the impacts of altering the hydropower production at Glen Canyon Dam. As stated by the Ninth Circuit, "[i]naccurate economic information may defeat the purpose of an EIS by 'impairing the agency's consideration of the adverse environmental

effects' and by 'skewing the public's evaluation' of the proposed agency action." *NRDC v. USFS*, 421 F.3d at 811-12 (quoting *Hughes River Watershed Conservancy v. Glickman*, 81 F.3d 437, 446 (4th Cir. 1996)); see also *Nat'l Wildlife Fed'n v. Nat'l Marine Fisheries Serv.*, 235 F. Supp. 2d 1143, 1157 (W.D. Wash. 2002) ("An EIS that relies upon misleading economic information may violate NEPA if the errors subvert NEPA's purpose of providing decisionmakers and the public an accurate assessment upon which to evaluate the proposed project."). As it must, the LTEMP FEIS considers the economic and environmental impacts caused by changes to power production at Glen Canyon Dam under different operational regimes. However, the LTEMP FEIS does not include consideration of the Power Study presented above, which was released after the close of the comment period on the LTEMP DEIS. Notably, by failing to include consideration of the high-quality information from the Power Study, the LTEMP FEIS does not thoroughly discuss the economic impacts, or the related environmental impacts, that modifications or potential removal of the hydropower production at Glen Canyon Dam would have under the various alternatives presented. This failing renders the LTEMP FEIS inadequate as it fails to take the required "hard look" at the consequences of the proposed action and alternatives.

Third, as explained in Part 3 above, the LTEMP FEIS does not present and consider recently released, peer reviewed scientific analysis estimating the GHG emissions from Glen Canyon Dam operations. As explained above, the LTEMP FEIS does not include analysis of the methane or other GHG emissions of any of the alternatives presented in the LTEMP FEIS. As a result, it fails to consider the foreseeable direct, indirect, and cumulative impacts of the operation of Glen Canyon Dam under the proposed action and alternatives. This failure is contrary to the requirements of NEPA, as well as contrary to the National Park Service's own guidance, and must be remedied for the LTEMP FEIS to be sufficient and allow for the requisite hard look at the environmental consequences of the proposed action.

5. The FEIS fails to consider an appropriate range of alternatives that meet the purpose, needs, and objectives of the proposed project.

Under NEPA, the Department of the Interior has an obligation to consider a reasonable range of alternatives when evaluating the proposed action. See 42 U.S.C. § 4332(2)(C); 40 C.F.R. § 1502.14. The alternatives analysis is the "heart" of an EIS. *Ctr. for Biological Diversity v. U.S. Dep't of Interior*, 623 F.3d 633, 642 (9th Cir. 2010) (quotation marks and citation omitted). "A federal agency's EIS must '[r]igorously explore and objectively evaluate all reasonable alternatives [to a proposed action], and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated.'" See *Alaska Conservation Council v. FHA*, 649 F.3d 1050, 1056 (9th Cir. 2011) (quoting 40 C.F.R. § 1502.14(a)). "An agency must look at every reasonable alternative, with the range dictated by the nature and scope of the proposed action, and sufficient to permit a reasoned choice." *Friends of Yosemite Valley v. Kempthorne*, 520 F.3d 1024, 1038 (9th Cir. 2008). The Ninth Circuit recognizes that if the agency fails to consider a viable or reasonable alternative, the EIS is inadequate. See e.g. *Friends of*

Yosemite Valley v. Kempthorne, 520 F.3d 1024, 1038 (9th Cir. 2008); *'Ilio'ulaokalani Coalition v. Rumsfeld*, 464 F.3d 1083, 1095 (9th Cir. 2006).

NEPA regulations also dictate that an EIS “include reasonable alternatives not within the jurisdiction of the lead agency.” 40 C.F.R. § 1502.14(c). “When the proposed action [...] is an integral part of a coordinated plan to deal with a broad problem, the range of alternatives that must be evaluated is broadened.” *'Ilio'ulaokalani Coalition*, 464 F.3d at 1098 (quoting *City of Alexandria v. Slater*, 198 F.3d 862, 868 (D.C. Cir. 1999) (quoting *Natural Res. Defense Council v. Morton*, 458 F.2d 827, 835 (D.C. Cir. 1972)) (quotation marks omitted).) An agency's refusal to consider an alternative that would require some action beyond that of its congressional authorization is counter to NEPA's intent to provide options for both agencies and Congress. See *NRDC v. Morton*, 458 F.2d at 836 (D.C. Cir. 1972) (“The mere fact that an alternative requires legislative implementation does not automatically establish it as beyond the domain of what is required for discussion, particularly since NEPA was intended to provide a basis for consideration and choice by the decisionmakers in the legislative as well as the executive branch.”).

Application of these rules here makes clear that the decommissioning of Glen Canyon Dam is a reasonable alternative for the long-term management of Glen Canyon Dam, and therefore that the Department of the Interior must analyze this alternative in the LTEMP FEIS. In its response to comments, the Department of the Interior stated that “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.” LTEMP FEIS, Chapter 2.3.8. This conclusory treatment of the Decommission Glen Canyon Dam Alternative does not satisfy the Department of the Interior's obligations under NEPA. This is especially true here, where “the proposed action [...] is an integral part of a coordinated plan to deal with a broad problem.” *'Ilio'ulaokalani Coalition*, 464 F.3d at 1098. In a situation such as this, where numerous federal agencies, State governments, and members of the public from many states have a vested interest in the outcome of the Department of the Interior's decision, evaluation of all viable alternatives is essential. Even if one or more of the options evaluated would require some legislative action and cooperation across jurisdictional lines to implement. As explained below, decommissioning Glen Canyon Dam meets the purpose, need, and objectives of the LTEMP as defined by the Department of the Interior.

First, the defined purpose of the proposed action 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.” LTEMP FEIS, Chapter 1.2. An alternative that provides for decommissioning Glen Canyon Dam over the next twenty years is not, on its face, inconsistent with this purpose. In fact, decommissioning Glen Canyon Dam would be consistent with many aspects of applicable laws, including:

- the GCPA's directive in section 1802 that long-term management of the dam be designed “to protect, mitigate adverse impacts to, and improve the values for

which Grand Canyon National Park and Glen Canyon National Recreational Area were established, including, but not limited to natural and cultural resources and visitor use.”

- the Colorado River Basin Project Act’s directive in section 1501(a) that the dam be managed for “improving water quality; providing for basic public outdoor recreation facilities; improving conditions for fish and wildlife, and the generation and sale of electrical power as an incident of the foregoing purposes.”
- the Colorado River Basin Project Act’s directive in section 1522 that the long range operation of the dam “shall reflect appropriate consideration of the uses of the reservoirs for all purposes, including flood control, river regulation, beneficial consumptive uses, power production, water quality control, recreation, enhancement of fish and wildlife, and other environmental factors.”

The GCPA, which is Congress’ most recent declaration on the factors to take into account when developing a long-term strategy for Glen Canyon Dam management emphasizes the importance of protecting and mitigating the adverse impacts of the dam. We now know that climate change may soon deprive Glen Canyon Dam of its ability to effectively serve the hydropower, water storage, and water delivery requirements for which it was built. And we also know that the operation of the dam is itself a contributor to the causes of this climate change undermining the usefulness of the dam. An alternative that examines a long-term strategy for phasing out Glen Canyon Dam is entirely consistent with the purpose of the proposed action as defined in the LTEMP FEIS.

Second, the Decommission Glen Canyon Dam Alternative is entirely consistent with the stated need for the proposed action. The stated need for the LTEMP FEIS is:

to use scientific information developed since the 1996 ROD to better inform DOI decisions on dam operations and other management and experimental actions so that the Secretary may continue to meet statutory responsibilities for protecting downstream resources for future generations, conserving species listed under the Endangered Species Act (ESA), avoiding or mitigating impacts on National Register of Historic Places (NRHP)-eligible properties, and protecting the interests of American Indian Tribes, while meeting obligations for water delivery and the generation of hydroelectric power.

LTEMP Chapter 1.2. LTEMP FEIS is necessary for the Secretary to balance its many, sometimes contradictory obligations on the Colorado River using recent scientific information. The Decommissioning Glen Canyon Dam Alternative fulfills this need. In particular it offers a solution for consideration by the public, the Secretary, and the Congress that takes critical new information about climate change and the future, practical lifespan of Glen Canyon Dam as a storage and power generation facility to permit a “reasoned choice” on whether and when phasing out Glen Canyon Dam operations is appropriate. The rule of reason demands

consideration of the Decommission Glen Canyon Dam Alternative in order to ensure adequate alternatives are presented in the LTEMP FEIS.

Third, the Decommission Glen Canyon Dam Alternative meets many of the objectives of the proposed action. The stated objectives of the proposed action that the alternative would presently meet, or partially meet, are:

- To develop an operating plan for Glen Canyon Dam in accordance with the GCPA to protect, mitigate adverse impacts to, and improve the values for which GCNP and GCNRA were established, including, but not limited to, natural and cultural resources and visitor use, and to do so in such a manner as is fully consistent with and subject to the Colorado River Compact, the Upper Colorado River Basin Compact, the Water Treaty of 1944 with Mexico, the decree of the U.S. Supreme Court in *Arizona v. California*, and the provisions of CRSPA and the Colorado River Basin Project Act of 1968 that govern the allocation, appropriation, development, and exportation of the waters of the Colorado River Basin (see Section 1.9.4) and in conformance with the Criteria for Coordinated Long-Range Operations of Colorado River Reservoirs which are currently implemented by the 2007 Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead.
- To ensure the LTEMP does not affect water delivery to the communities and agriculture that depend on Colorado River water consistent with applicable determinations of annual water release volumes from Glen Canyon Dam made pursuant to the LROC for Colorado River Basin Reservoirs, which are currently implemented through the 2007 Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead.
- To consider potential future modifications to Glen Canyon Dam operations and other flow and non-flow actions to protect and improve downstream resources.
- To respect the interests and perspectives of American Indian Tribes.
- To make use of the latest relevant scientific studies, especially those conducted since 1996.
- To determine the appropriate experimental framework that allows for a range of programs and actions, including ongoing and necessary research, monitoring, studies, and management actions in keeping with the adaptive management process.
- To ensure Glen Canyon Dam operations and non-flow actions under the LTEMP are consistent with the GCPA, ESA, NHPA, CRSPA, and other applicable federal laws.

Certainly in order to completely fulfill all these objectives, additional action outside the jurisdiction of the Department of the Interior would be necessary. But this is not the standard that must be met before an alternative is reasonable and should be considered. In fact, not all of the alternatives already included and evaluated in the LTEMP FEIS meet all the stated objectives. Because the Decommission Glen Canyon Dam Alternative is consistent with and capable of meeting many if not all of the objections of the proposed action, the Department of the Interior should have included it in the LTEMP FEIS.


Even if the Department of the Interior once believed it was reasonable too assume that continued operation of Glen Canyon Dam could never include a long-term plan to phase out and decommission the dam, such a conclusion is arbitrary and capricious in light of all currently available information. Most notably, the recent studies on the impacts of climate change on the flows in the Colorado River, the recent report on the economic impacts of removing hydropower production, and new peer-reviewed science on the contributions of methane and GHGs from Glen Canyon Dam operations makes it abundantly clear that decommissioning the dam a reasonable and feasible alternative that must be considered. Further, consideration of the currently proposed alternatives in light of this new information alters the conclusions related to the impacts of the current alternatives, potentially making them unreasonable. It is the Department of the Interior's obligation to consider all the information on climate change and economic impacts, and be certain to include alternatives in the LTEMP EIS that are consistent with the possibilities presented under current and future circumstances.

The Department of the Interior's assertion that "the [Decommission Glen Canyon Dam] 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" ignores the fact that many aspects of the alternative would satisfy and promote multiple elements of each of the laws governing the Colorado River use and allocation, as explained above. And while we acknowledge that many of these laws presumptively assume the operation of Glen Canyon Dam, they also make clear that impacts caused by the dam's operation should be managed to meet many, competing needs. When, as now, the information and best science available informs us that the dam's impacts and the continued feasibility of operating the dam in the long-term is in question, it is reasonable for the Department of the Interior to consider an alternative that phases out operation of the dam.

Finally, it is insufficient for the Department of the Interior to deny consideration of such an alternative because it believes doing so would require action by Congress or states to be implemented. *See Natural Res. Defense Council v. Morton*, 458 F.2d at 836 (D.C. Cir. 1972) ("The mere fact that an alternative requires legislative implementation does not automatically establish it as beyond the domain of what is required for discussion, particularly since NEPA was intended to provide a basis for consideration and choice by the decisionmakers in the legislative as well as the executive branch."). Further, the Colorado River Compact specifically allows for a Compact Call when current operations and obligations under the Law of the River become untenable. The Department of the Interior has denied the public and the decisionmakers, and the Congress that specifically directed preparation of the LTEMP, of the opportunity to review an alternative that may, on balance, more completely and responsibly manage the resources of the Colorado River. By failing to include the Decommission Glen Canyon Dam Alternative, the Department of the Interior has deprived the LTEMP FEIS of its essential function of facilitating a "hard look" at alternatives and their environmental consequences.

Please insert this letter into the public record for the LTEMP FEIS.

Thank you,

A handwritten signature in black ink that reads "Gary Wockner". The signature is written in a cursive, flowing style.

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Gary Wockner, PhD, Executive Director
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