Comments sent via email: lpp@usbr.gov
September 7, 2020
Mr. Rick Baxter, Program Manager
Bureau of Reclamation, Provo Area Office
302 East Lakeview Parkway
Provo, Utah 84606

RE: Comments on Lake Powell Pipeline Project Draft Environmental Impact Statement.

Dear Mr. Baxter,

Please accept and fully consider these comments from the Lake Powell Pipeline Coalition (LPPC, or Coalition) on the Draft Environmental Impact Statement (DEIS) for the Lake Powell Pipeline project (LPP). A flash drive with reference materials was sent previously by surface mail.

The Coalition appreciates the opportunity to comment on DEIS. The Coalition consists of: Conserve Southwest Utah, Center for Biological Diversity, Glen Canyon Institute, Grand Staircase Escalante Partners, Great Basin Water Network, Living Rivers Colorado Riverkeeper, The Rewilding Institute, Grand Canyon Chapter Sierra Club, Utah Chapter Sierra Club, Southern Utah Wilderness Alliance, Utah Audubon Council, Utah Rivers Council, Western Wildlife Conservancy, Wild Arizona, and The Wilderness Society. A description of these Coalition members follows. Some of the Coalition members have been studying and commenting on the LPP for over eleven years.[1]

Sincerely,

Jane Whalen, Coordinator
Lake Powell Pipeline Coalition
Conserve Southwest Utah
321 N Mall Drive, Ste. B202
St. George, Utah 84790435-635-2133
email@conserveswu.org

1. See:
Conserve Southwest Utah (formerly Citizens for Dixie Future) et al., "Motion to Intervene by Citizens for Dixie's Future, Glen Canyon Institute, Sierra Club, Living Rivers, American Rivers, and Town of Springdale, Utah in P-12966", FERC eLibrary accession no. 20080102-5057 (January 2, 2008);
"ILP Comments or Study Requests of Natural Heritage Institute (CA)," on Scoping Document 1 and Pre-Application Document, and Additional Study Requests, eLibrary accession no. 20080707-5206 (Jul. 7, 2008);
"Lake Powell Pipeline Coalition's Comments on Proposed Study Plan and Scoping Document 2", eLibrary accession no. 20081119-5130 (November 19, 2008);
"Comments Lake Powell Pipeline Coalition," on Study Plans and Draft Study Reports, eLibrary accession no. 20110506-5125 (May 6, 2011);
"Comments Lake Powell Pipeline Coalition," on Modified Draft Study Reports, eLibrary accession no. 20120323-5005 (Mar. 23, 2012);
"Comments Lake Powell Pipeline Coalition," PLP and revised draft study reports eLibrary accession no. 20160229-5176 (February 29, 2016);
"Comments Lake Powell Pipeline Coalition," NREA Comments eLibrary accession no.20181120-5012 (November 20, 2018)

Douglas W. Wolf
Senior Attorney
Center for Biological Diversity
3201 Zafarano Drive
Suite C, #149
Santa Fe, NM 87507
202-510-5604
Dwolf@biologicaldiversity.org

Eric Balken
Glen Canyon Institute
429 E. 100 S.
Salt Lake City, Utah 84111
801-383-4450
eric@glencanyon.org

Sarah Bauman
Executive Director
Grand Staircase Escalante Partners
PO Box 53, 310 S 100 E #7
Kanab, Utah 84741
435-644-2724
Sarah@gsenm.org

John Weisheit, Co-founder
Living Rivers Colorado Riverkeeper
PO Box 466
Moab, Utah 84532
435-259-1063
John@livingrivers.org

Kim Crumbo
The Rewilding Institute
3275 Taylor Avenue
Ogden, UT 84403
928-606-5850
kcrumbo43@icloud.com

Sandy Bahr, Director
Grand Canyon Chapter of Sierra Club
514 W. Roosevelt St.
Phoenix, Arizona 85003
602-253-85003
Sandy.bahr@sierraclub.org

Carly Ferro
Utah Chapter of Sierra Club
423 West 800 South, Ste A103
Salt Lake City, Utah 84161
801-467-9294 x102
Carly.Ferro@sierraclub.org

Kyle Roerink
Executive Director
Great Basin Water Network
P.O. Box 75
Baker, Nevada 89311
702-324-9662
kyle4gbwn@gmail.com

Kya Marienfeld
Wildlands Attorney
Southern Utah Wilderness Alliance
425 East 100 South
Salt Lake City, UT 84111

(435) 259-5440
kya@suwa.org

Georgie Corkery, President
Utah Audubon Council
2764 East 200 North
Layton, UT 84040
801-814-7544
Georgie.corkery@gmail.com

Zach Frankel Director
Utah Rivers Council
1055 East 2100 South, Suite 201
Salt Lake City, Utah 84106
(801) 486-4776
zach@utahrivers.org

Kirk Robinson, PhD
Executive Director
Western Wildlife Conservancy
1021 Downington Ave.
Salt Lake City, UT 84105
Lynx@xmission.com

Kelly Burke
Wild Arizona
PO Box 40340
Tucson, Arizona, 85117
928-606-7870
kelly@wildarizona.org

Phil Hanceford
The Wilderness Society
1660 Wynkoop St., Ste 850
Denver, Colorado 80202
303-650-5818
phil_hanceford@tws.org

Coalition Members

Conserve Southwest Utah (CSU) is a grassroots nonprofit 501(c)(3) organization based in Washington County, Utah, advocating for conservation of our natural resources. CSU was established in 2006 as Citizens' for Dixie's Future (CDF) after the Washington County Growth and Conservation Act was introduced in the U.S. Congress because of concerns, in part, that the Lake Powell Pipeline right of way was included in the legislation. CSU worked tirelessly on revisions to the bill that resulted in the Lake Powell Pipeline being excised from the bill and that bill did not pass. Many CSU members and supporters live near and recreate on these public lands. Membership includes more than 2,000 individuals. These lands provide unique opportunities for sightseeing, hiking, camping, trail running, mountain biking, appreciation of archaeological resources and natural quiet, journaling, birdwatching, ecosystem research, photography and more. Our vision is that Southwest Utah grows in a manner that enables conservation and restoration of its natural and cultural resources. Our mission is to advocate for conservation and stewardship of our area's natural and cultural resources and for implementation of the Smart Growth policies that enable conservation for the benefit of present and future generations.

The **Center for Biological** Diversity is a non-profit environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center has over 70,000 members, including over 680 members living in Utah. The Center's staff and members have visited and intend to continue to visit the Green River, the Colorado River, Lake Powell and southwestern Utah for recreational, scientific, educational, spiritual and other pursuits and intend to continue to do so in the future, and are particularly interested in protecting the many native, imperiled, and sensitive species and their habitats, including and especially the Colorado River endangered fish species, that may be affected by the proposed change application and the desert tortoise.

Glen Canyon Institute's (GCI) mission is to restore a healthy, free-flowing Colorado River through Glen Canyon and Grand Canyon. Founded in 1996, GCI has facilitated over 10 peer-reviewed studies on Glen Canyon Dam and its impacts. GCI is a science-based advocacy group working to build the foundation of research around Glen Canyon and Grand Canyon's restoration. GCI has been involved with the debate over the Lake Powell Pipeline since 2013, because the project would cause irreparable harm to the Colorado River, putting further pressure on its ecosystem and increasing the risk to its ecological health, and jeopardizing the long term recovery of Glen Canyon.

Grand Staircase Escalante Partners ("GSEP") is a Utah 501(c)(3) non-profit corporation founded in 2004 as the official "Friends" organization of Grand Staircase Escalante National Monument (GSENM). Our mission is to honor the past and safeguard the future of the GSENM through science, conservation, and education. GSEP achieves its mission by conducting educational programs, supporting scientific research, and working collaboratively with the BLM on habitat restoration and conservation projects. GSEP actively promotes the success of the vibrant local communities by collaborating with local businesses in support of GSENM activities and programs. The LPP pipeline route passes through a portion of GSENM that was excised from the Monument on December 4, 2017, lands that GSEP believes will be restored to the Monument in the near future. Because the pipeline corridor would be "industrialized" with lights,

access roads, and other equipment, it will harm the natural resources which the Monument was established to protect.

The **Great Basin Water Network** is a network of organizations, businesses, and individuals who have banded together so that decisions on all water development proposals in the Great Basin are made in the open with caution, coherence, and based on the best scientific information. Its supporters spent more than 30 years fighting to stop the Las Vegas Groundwater Development Project and have been a party to the LPP proceedings since it was under FERC's jurisdiction. We have long advocated that conservation is the best way to a sustainable water future. Despite our differences with the Southern Nevada Water Authority over the years, Las Vegas' water managers made conservation investments that have paid off for Mojave Desert residents who rely on the Colorado River. Without an expensive, environmentally harmful pipeline, SNWA is reliably delivering for its customers and will be able to do so in the coming decades. We believe that the conservation playbook penned by SNWA contains less expensive solutions for Washington County water users that will have better outcomes for the long-term health of the river and the communities it supports. Additionally, we believe that if a new pipeline sucks 28 billion gallons of water out of the river annually, it will put a target back on the communities in the Great Basin that spent decades working to protect their limited groundwater resources.

Living Rivers/Colorado Riverkeeper was established in 2000 and is dedicated to articulating conservation and alternative management strategies to the public. Living Rivers/Colorado Riverkeeper empowers a movement to instill a new ethic of achieving ecological restoration, balanced with meeting human needs. We work to restore inundated river canyons, wetlands, and the delta, repeal antiquated laws that represent the river's death sentence, reduce water and energy use and their impacts on the river, and recruit constituents to aid in reviving the Colorado. Living Rivers seeks to revive the natural habitat and spirit of rivers by undoing the extensive damage done by dams, diversions and pollution on the Colorado Plateau. In 2002, our organization joined the Waterkeeper Alliance and serves officially as the Colorado Riverkeeper. Living Rivers and Colorado Riverkeeper are based in Grand County Utah, which borders the Green River on its east bank, as well as the Colorado River and the Dolores River. Living Rivers has approximately 1,200 members in Utah, Colorado, and other states. The members and staff of Living Rivers recreate on the Green River, but more importantly they monitor and protect the water resources of the Colorado Plateau by land and river utilizing specialized boats, vehicles and equipment. Living Rivers and Colorado Riverkeeper have been engaged in the application process of the Lake Powell Pipeline Project since July of 2007.

The **Rewilding Institute** is a 501(c)(3) continental conservation group dedicated to protecting, restoring, and reconnecting wild places and creatures across North America and beyond. We see the Kaibab-Paunsaugunt Wildlife Corridor as a key part of a much larger Spine of the Continent, or Rocky Mountain wildlife corridor, or the Western Wildway, for short. We oppose the "Lake" Powell Pipeline because it will fragment habitat critical to wide-ranging species including puma, wolf (extirpated but should be restored), black bear, and mule deer. The pipeline itself and attendant infrastructure will degrade habitat and increase human impacts in one of the least spoiled regions of the United States. As well, the pipeline will facilitate overuse of the Colorado River, which is already over-allocated—even in terms of human uses; and we aver that the Colorado River should be kept as whole and as natural as possible, for the sake of all native creatures of the Colorado River basin.

The Utah and Grand Canyon (Arizona) chapters of the **Sierra Club** are part of America's largest and most influential grassroots environmental organization, the Sierra Club, with more than 3.8 million members and supporters. In addition to protecting every person's right to get outdoors and access the healing power of nature, the Sierra Club works to promote clean energy, safeguard the health of our communities, protect wildlife, and preserve our remaining wild places through grassroots activism, public education, lobbying, and legal action. Sierra Club and its members have long advocated for the protection of the Colorado River and surrounding lands as well as the plants and animals and recreate in the region.

The **Southern Utah Wilderness Alliance** (SUWA) is a 501(c)(3) non-profit environmental membership organization with members in all fifty states and offices in Washington, D.C. and Utah. It is dedicated to the sensible management of all federal public lands within the State of Utah, the preservation and protection of plant and animal species, the protection of clean air and water found on federal public lands, the preservation and protection of cultural and archaeological resources, and the permanent preservation of Utah's remaining wild lands. SUWA staff and members actively support the preservation of wildlands identified in the proposed project area for current and future generations of Americans. SUWA staff and members have worked for decades to obtain permanent, heightened protection for lands within the proposed pipeline route and associated impacted areas, including wilderness designation and through other land-use decisions such as resource management plans, conservation area designation, and withdrawal from mineral leasing and other development.

Utah Audubon Council is the policy arm representing the four Audubon chapters in Utah (Great Salt Lake Audubon, Wasatch Audubon, Bridgerland Audubon, and Red Cliffs Audubon) and their collective membership of over 1000 members. We are opposed to the LPP primarily because it poses a threat to wildlife habitat and ignores practical conservation practices that would maintain an adequate water supply to residents. Utah Audubon Council promotes the mission of National Audubon Society, as it protects birds and the places they need, today and tomorrow, throughout the Americas using science, advocacy, education, and on-the-ground conservation, and coordinates legislative education and communications on environmental issues affecting the nature of Utah for people and wildlife.

Western Wildlife Conservancy is a 501(c)(3) organization founded in Salt Lake City, Utah, in 1997 to protect and conserve native wildlife and wildlife habitat in the Intermountain West. The proposed Lake Powell pipeline, if built, will prove to be a waste of precious water that both wildlife and humans depend on in the arid West. Washington County, where most of the water would be delivered, has an average daily household use of water that is one of the most wasteful in the entire USA. In addition, the pipeline would constitute an additional barrier to wildlife movement (mule deer and other species) between the Kaibab and Paunsaugunt Plateaus, thus in effect severing a major wildlife movement corridor.

Wild Arizona is a statewide conservation organization working to protect, unite, and restore wild lands and waters across Arizona and beyond. We pursue this mission for the enrichment and health of all generations, and to ensure Arizona's native plants and animals a lasting home in wild nature. Wild Arizona has a long history of advocacy; field research, including springs surveys; GIS connectivity analysis; road inventory, habitat and corridor exploration, including outdoor events with our supporters; springs restoration; and planning engagement with land and wildlife agencies on the Arizona Strip; as well as specific involvement during the length of the

Lake Powell pipeline proposal process (starting as Grand Canyon Wildlands Council). Wild Arizona's 2,500 members, supporters, and volunteers care deeply about the science-based stewardship of the Arizona Strip's biodiverse, unique, and wild complex ecosystems, connected habitats, natural waters and riparian areas, as well as the traditional cultural landscapes and homelands of the many Indigenous peoples of the region, including in particular the Kaibab Band of the Southern Paiute Tribe.

The **Wilderness Society** (TWS) is a 501(c)(3) national organization founded in 1935, with members who reside throughout the nation. TWS works to protect America's wilderness lands through public education, scientific analysis, and advocacy. TWS's mission is to protect wilderness and inspire Americans to care about our wild places, so that future generations will enjoy the clean air, water, wildlife, beauty, and opportunities for recreation and renewal that pristine deserts, mountains, forests, and rivers provide. Protecting wilderness quality and other sensitive lands managed by BLM is vital to achieving The Wilderness Society's mission.

Following the Introduction, our comments are organized by the sections and pages in the DEIS itself.

Table of Contents

INTRODUCTION

The Coalition is concerned that the LPP will further diminish an already over allocated Colorado River, where existing deficits have not yet been addressed. It would increase the diversion from the Colorado River at a time when existing water supply diversions (as well as ecological needs) already result in a functional deficit due to warming temperatures and shorter winters, leaving less snow melting at the river's source. We are concerned that the project would worsen water deficits for other beneficial uses of the Colorado River and Lake Powell, and it would otherwise cause significant, un-mitigatable impacts on such uses.

It has been well documented by the Bureau of Reclamation (BOR) that there is more water allocated in the Colorado River than the river produces annually, even without considering a warming climate. Yet, the BOR continues to over allocate the Colorado River by selling water to Utah even though there isn't any physical water to sell. The releases from Lake Powell and Lake Mead continue to exceed inflows. This over allocation is draining the reservoirs faster than anyone predicted. The Colorado River has reached its limit, yet plans are underway to take more water for the LPP.

Many of the Coalition's members and supporters live near and recreate in areas across the Colorado Plateau, the Great Basin, and the Green and Colorado Rivers that would be occupied or otherwise affected by the LPP, if approved. These areas are particularly valuable due to their character as undisturbed and uninhabited wildlands. They include Little Creek Mesa and the

Little Creek Area of Critical Environmental Concern (ACEC), Kanab Creek ACEC, the Arizona Strip, the Cockscomb, and the Grand Staircase-Escalante National Monument (GSENM). These areas provide unique opportunities for river running, fishing, hiking, camping, trail running, geocaching, mountain biking, appreciation of archaeological resources and natural quiet, journaling, birdwatching, ecosystem research, photography, and more. As stated in the Presidential Proclamation establishing the Grand Staircase Escalante National Monument, this is a "vast and austere landscape [that] embraces a spectacular array of scientific and historic resources... This unspoiled natural area remains a frontier, a quality that greatly enhances the GSENM's value for scientific study."[1]

The lead and cooperating agencies are obligated to consider the direct, indirect, and cumulative impacts of the industrialization of the pipeline's corridor to the land along the highways and through the lands designated as the Grand Staircase Escalante National Monument in 1996. These lands are being litigated in the courts and may regain monument status. We realize that there is an approved right-of-way for the pipeline along the highway. However, the pipeline's proposed infrastructure will affect the Monument's values by the proposed hydroelectric turbine and pumping stations with power lines with tall steel poles connecting them to existing power grids, substations, lights, parking lots, new paved access roads, regulating tanks and reservoirs, manholes, blow off valves, fencing, buried forebay tanks, buried surge tanks, (pipeline inspection gauge, or pig, retrieval, used to clean the pipe) and surface overflow detention basins. The continued operation, weekly maintenance, repair, and excavation of the pipeline would significantly degrade the region's wildland pristine character. We are concerned about the damage to the land of building the pipeline, and all needed infrastructure cannot be rehabilitated or mitigated in this arid land. The pipeline will have an irreversible and irretrievable impact on these lands that are pristine natural lands and aspects of our National Heritage to be protected for future generations. See 42 U.S.C. 4331.[2]

For the purpose of commenting on the DEIS, the section in the DEIS receiving a comment is identified by the section number, title, and page number. Quoted text is italicized and indented. The Lake Powell Pipeline Coalition's (Coalition) comments follow.

Lake Powell Pipeline Project Draft Environmental Impact Statement

ES-1 Project Background, page 1.

> *"The UBWR holds Water Right No. 41-3479, which allows 447,500 acre-feet of Colorado River diversions. The UBWR segregated this water right in various ways, but it retained 86,249 acre-feet as part of Water Right No. 41-3479 for the LPP. This LPP water is already allocated to Utah as part of its apportionment from the Colorado River Compact of 1922. The UBWR intends to use up to 86,249 acre-feet per year to address future water demands in southwest Utah."*

1. Presidential Proclamation 6920 September 18, 1996, "Establishment of the Grand Staircase-Escalante National Monument," available at http://www.ut.blm.gov/monument/planning-proclamation.php.
2. 42 U.S.C. 4331; at: https://www.law.cornell.edu/uscode/text/42/4331

Coalition: The Coalition is concerned that there is insufficient water from the Water Right No. 41-3479 used for the LPP and believes BOR must establish whether this water actually exists and is likely to be available for the Green River endangered fishes (and for Washington County) for the 50-year term of the water exchange contract for the LPP. We suggest it is a paper water right that does not include physical water because the State of Utah has already allocated all of the spring runoff of the Green River tributaries to others.

See our comments on Section 3.2.12 below for more detailed comments on BOR's failure to properly analyze the amount of water that could be sold from Flaming Gorge Reservoir because BOR did not consider reductions to spring run-off resulting from climate change. Essentially, the DEIS is not sufficient because it lacks any accounting of the amount of high spring flows that are needed for the CRSP to meet its Lower Basin obligation at Lee Ferry, or to have enough high spring flows for the Central Utah Project, and also have enough high water run-off to exchange for the two BOR service contracts. Most importantly, all these high spring rights are junior to senior water rights holders. The Coalition is concerned the already very over-allocated Green River is to be over-allocated further without any analysis by BOR in the DEIS. Further, one of the responsibilities of BOR is to protect Native American water rights and in this case it appears they are not doing so because there are unsettled tribal rights still in the Upper Basin that have priority over state's water rights yet their concerns about the building of LPP have been left out of the DEIS.

ES-2 Scoping page 2.

> *"Reclamation initiated another scoping period with the issuance of an NOI on December 6, 2019, to solicit input from the public and agencies on the revised Proposed Project. The scoping period began when the NOI was published and ended on January 10, 2020. A total of 1,125 submissions were made during that period (Table ES-2-1). Because each submission can contain multiple comments regarding different topics, submissions were segmented by topic. The total number of segments was 1,307. Reclamation's final scoping report for 2019 to 2020 scoping effort is available on Reclamation's LPP website."*

Coalition: All of these concerns from the public during scoping were noted in the BOR's scoping report but none of these concerns were considered or analyzed in the DEIS. They included:

> *"A total of 114 comments were received concerning the Proposed Project alternatives. The comments primarily concerned utilizing a water conservation alternative; this included suggestions for limiting irrigation of lawns and golf courses which they purport would make the pipeline unnecessary."*
>
> *"A total of 43 comments addressed climate change and greenhouse gases. The comments were primarily related to what the short and long-term effects of the water supply would be and how the river flow could be affected by the proposed LPP Project."*
>
> *"Eight comments addressed Native American concerns. Some of the commenters expressed their concerns with water supply and the water rights of*

tribes in the region. By transporting water away from the area, the stakeholders are concerned with the availability of water for those tribal communities."

"As part of the scoping process, a total of 42 comments were received that addressed the NEPA process. Many of the commenters requested an update to the Federal Energy Regulatory Commission's (FERC) studies with findings that include climate change, water projections, and population growth. The comments showed concern for using outdated studies, which may misguide decision-making."

"A total of 41 comments were received that addressed proposed LPP Project costs. Many of the commenters were concerned with the cost of the proposed LPP Project to taxpayers and the overall cost of the proposed LPP Project. Several questioned whether residents of Washington and Kane County would fund the proposed LPP Project, or if the entire state would provide funds. Additionally, many suggested that a water conservation alternative would save taxpayer money and avoid the proposed LPP Project altogether."

"A total of 64 comments were received addressing water law and water rights of other states and tribes. Many commenters addressed concerns over watersheds and water rights of the upper and lower basins and the security of Utah's water claims in their submittals."

"Among the substantive comments, 99 addressed water supply and availability. Commenters were concerned with the long-term availability of water from the Colorado River with the onset of climate change, as well as the use of reclaimed water and rainwater for landscaping and irrigation."

Coalition: We outlined our concerns with BOR's Scoping Report in separate comments. See comments on the report in Appendix B. BOR did not consider the scoping comments to decide the issues for the DEIS. They adopted the proponents' proposed project without vetting the claims of the need for water.

ES-3 Purpose and Need, page 3.

"The Virgin River Basin is the sole source for the WCWCD's water supply, which presents challenges in providing a reliable water supply for a fast growing population.

"Under median climate change scenarios, approximately 86,000 acre-feet of water will be needed annually by 2060 to satisfy increased water demands (Appendix B, Purpose, and Need Report) of a growing population in Washington County, Utah (Gardner Institute 2017). A more diverse and secure water supply is needed to mitigate vulnerabilities to unexpected demand and supply scenarios and to ensure reliable water deliveries into the future (UBWR 2019)."

Coalition: Conserve Southwest Utah requested that Ben Harding from Lynker Technologies, an expert on Colorado River hydrological modeling, review the Lake Powell Pipeline's Draft Environmental Impact Statement. Mr. Harding wrote an 18-page memorandum of his comments, and we included them into the record as Appendix C. It describes that the Lake Powell Pipeline will not be a reliable source of water for Washington County.

From the Lynker Memorandum[3]:

> *"The Lake Powell Pipeline Project (the Project) is proposed to deliver 86,249 acre-feet (af) of water annually from Lake Powell to Washington County, Utah. The DEIS infers that this full amount would be available every year, but in fact in many years the Project would almost certainly be limited to a lower or to no yield by curtailments under the Colorado River Compact and the Upper Colorado River Basin Compact arising from a flow shortfall on the Colorado River at Lee Ferry (Castle and Fleck, 2019; Harding, 2019). These curtailments would reduce the reliability of the project (and its average, long-term yield) and would consequently reduce the ability of the project to fulfill its declared purpose and need and would reduce its water supply benefits. What is generally unrecognized is that these curtailments are also mechanisms whereby operation of the Project can impair the operation of other more senior Colorado River water rights in Utah, and Colorado River water rights in the States of the Lower Division, impacts that have not been addressed in the DEIS.*
>
> *"The DEIS has also employed analytical methodological choices that overstate the performance of the project and understate its impact on other water rights, and it has not reported analytical results that directly quantify the expected reliability and impacts of the project. The results that are presented in the DEIS suggest that the Project would not be able to deliver its full yield, and possibly any yield, on average about every 4 to 7 years. In any year in which the Project is fully curtailed an impairment of other water rights would almost certainly occur.*
>
> *"The DEIS is deficient for the following reasons:*
>
> - *"It assumes that the Project will be 100% reliable, that is that it will supply its nominal yield of 86,249 af every year during its operational life. The available evidence and analyses suggest that the project yield will be reduced or eliminated in many years due to curtailments of water use in Utah under the Colorado River Compact and the Upper Colorado River Basin Compact;*
> - *"It does not evaluate and describe the degree to which curtailments caused by the Project would cause impairment of senior water rights within Utah;*

3. Harding, B., Memorandum prepared for Conserve Southwest Utah: "Lake Powell Pipeline, Draft Environmental Impact Statement", Lynker Technologies, LLC, July 28, 2020, full text in Appendix C.

- *"It does not evaluate and describe the degree to which depletions from Lake Powell by the Project could impair water rights in the Lower Basin;*

- *"It does not evaluate and quantify the effect of climate change on the performance of the Project; it simply assumes that the Project will be able to deliver its nominal yield in every year during its operational life;*

- *"The hydrology analyses on which the DEIS is based, and Reclamation's 2012 Basin Supply and Demand Study suggest that the project will be unable to deliver its full yield or any yield at all in many years in the future, but the results of these analyses are ignored in the DEIS;*

- *"The hydrology analyses on which the DEIS is based and Reclamation's 2012 Basin Supply and Demand Study have methodological shortcomings that result in overstatement of the performance of the Project and understatement of its impacts."*[4]

These issues are addressed in detail in the rest of this memorandum see Appendix C.

Therefore, the DEIS analysis and assumptions are based on flawed information because they assert, without evidence, that the LPP is a reliable source of water, and it is not. The proponents may have a valid paper water right, but there is not physical water to develop the water right because the Colorado River physical water is over-allocated. The DEIS lacks any information on how much physical water the Colorado River Basin states can share and rely on for the long term.

The DEIS's hydrological modeling ignores the effect of climate change on Project yield. From an analysis by Lynker Technologies: [5]

> *"The DEIS adopts projections of hydrologic conditions under five future climate scenarios to show that Washington County Water Conservancy District (WCWCD) would experience 2060 supply deficits ranging from approximately 54,000 AFY to approximately 113,000 AFY, or more. These projected deficits are used to establish the need for the project. The project purpose is to supply water to the WCWCD to eliminate or reduce these deficits.*
>
> *"However, the DEIS applies inconsistent analytical approaches for the assessment of need and purpose. In assessing need, the DEIS quantifies the effect of climate change on water supply shortfalls to WCWCD, as noted above, but it ignores the effect of climate change when assessing the ability of the Project to deliver water, and assumes that the nominal annual yield claimed for the Project, 86,249 AFY, would be available in every year. The*

4. Ibid, pages 1-18.
5. Ibid, pages 6-18.

very research cited in support of the assessment of need offers a dire picture of future water supply on the Colorado River and suggests that the yield of the project is highly uncertain. Further, the hydrology studies incorporated into the DEIS documents suggest that the yield of the Project would not be reliable."

"The DEIS cites recent published research by Udall and Overpeck (2017) and Milly and Dunne (2020) to support projections of lower flows on the Virgin River, and thus larger WCWCD supply shortfalls. However, the results in both Udall and Overpeck and Milly and Dunne encompass the entire Upper Colorado River Basin and can be directly applied to natural flow at Lee Ferry. The expected value of flow changes at 2050 ranged from -7% to -27% for Udall and Overpeck and -14% to -31% for Milly and Dunne. Very roughly speaking, these projections translate to reductions in water available to Utah of 240 thousand AFY (kaf) to 1 MAFY."[6]

Most important, the DEIS fails to consider Utah's allocation being reduced by predicted lower flows in the Colorado River. A possible 7 percent reduction or more in the flow on Utah's remaining share of the Colorado River would have a significate impact on water availability for the LPP. Utah's allocation is not a fixed amount; it is only 23 percent percentage of the available water in Upper Basin and is only available after senior water rights holders are met. A 7 percent reduction of 240,000 AFY to Utah's remaining share would mean no water for the LPP. The remaining water is for Native American Tribes. See Figure 1 below.

Therefore, the LPP water right is a paper water right. The primary reasons for the difference between the paper water and actual wet water are: 1) the priority date of the water right, and 2) the reliability of the water source to supply adequate water, particularly during drought conditions. The priority date is very important because, in Utah law, the water right(s) with the earliest priority date receives their full supply before water rights with a later priority date are delivered water.

On paper, Utah may not be using its remaining share of the Colorado River, but there is not enough physical water supply left to develop if we consider declining future flows. In addition, Utah has significantly over appropriated its Upper Basin Colorado River rights. This situation needs to be analyzed in the DEIS before the BOR sells water for the Water Right No 41-3479 for the Lake Powell Pipeline.

In 2018, Conserve Southwest Utah submitted a formal Government Records Access and Management Act (GRAMA) records request to review the water rights that Utah is using of its 1.369 MAF Upper Basin allocation and the state failed to respond. This puts in doubt the claim that Utah has enough water in its allocation for the LPP to exchange it with BOR. Since the water exchange contract will be approved using this DEIS, the BOR should include an analysis of Utah's water rights that it wants to exchange. The BOR must validate that Utah has this

6. Based on a long-term average flow at Lee Ferry of 15 MAFY. A 7% reduction of 15 MAFY is 1.05 MAFY, which would be borne by the Upper Division states. Utah is apportioned 23% of the water available to the Upper Division states; its share of the 7% reduction is thus about 240,000 AFY. Harding, B., "Memorandum to Conserve Southwest Utah: Lake Powell Pipeline, Draft Environmental Impact Statement", Lynker Technologies LLC, July 28, 2020, page 7, (See Appendix C).

surplus water in its allocation to complete the water exchange contract in the DEIS. We suspect they do not have this large amount of unused high water.

In 2018, CSU submitted another GRAMA request to the UDWRe to request the specific water rights they are exchanging. Their response thus far is that the records from the UDWRe and the Division of Water Rights (UDWRi) do not agree with each other.

CSU was not able to get the current information from the UDWRe or the UDWRi, therefore we gathered information on depletions. We found a UDWRi's PowerPoint presentation on-line, the contents of which are reproduced below.[7]

Utah claims it is using 1,007,500 AFY according to UDWRi, but the State uses a "*Water Budget"* model to come up these numbers. Conserve Southwest Utah found in its preliminary research of the depletions that there is much more water used in these categories today not yet identified as water use in this chart. Therefore, that doesn't leave enough water for the LPP in the BOR's assigned 1995 Water Right No 41-3479 because Utah already allocated its full share of Colorado River water to others.

Table 1, reproduced from Utah Division Water Resources (UDWRe), shows proposed uses for Utah's remaining share of the Colorado River and shows Utah assumes it has 361,000 AFY of water from Colorado River Compact water left to develop. However, if lower flows of below 15 MAFY are used in the analysis Utah's compact rights are reduced and that eliminates the availability of water for the Lake Powell Pipeline.

7. Utah Division of Water Rights, "Upper Colorado River Basin Current Water Rights Issues", April 2005, at https://www.waterrights.utah.gov/meetinfo/m042005/jdo_2005.ppt.

Figure 1. Slides from UDWRi presentation describing Utah's Colorado River allocations.

Table 1. Proposed new uses for Colorado River Water	
Utah's planned new users of Colorado River	**Utah's Total Allocation 1.369 MAFY, 1.008 MAFY used (AFY)**
Ute Tribe Reserved Water (unsettled)	105,000
Navajo Nation Reserved Water (introduced Congress)	81,000
Lake Powell Pipeline	86,000
New Agricultural Uses	40,000
New M&I Uses	29,000
Total new planned uses	**361,000**

Another example of over allocation of Utah's remaining Colorado River share of 361,000 AFY is illustrated in Figure 2, from a UDWRi 2005 power point slide:[8]

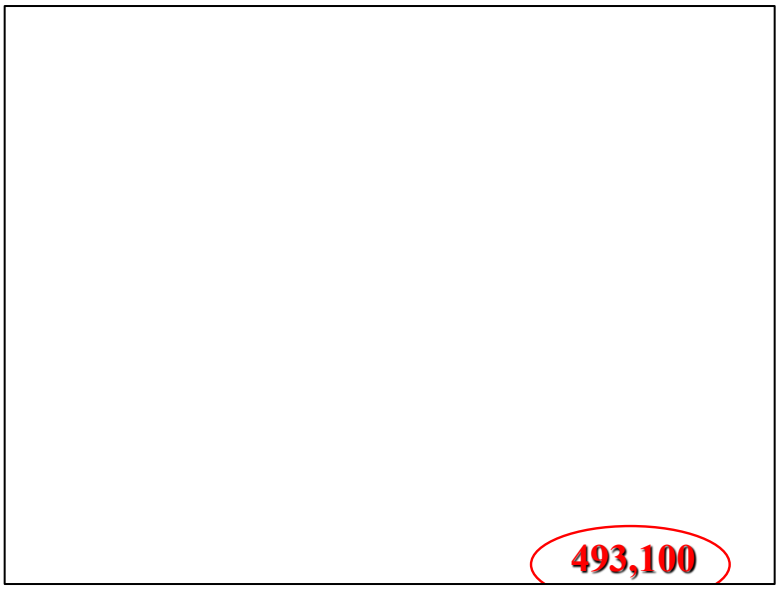


Figure 2. UDWRi presentation showing approved applications for water rights from the Colorado River.

The DEIS is deficient for the following reasons: [9]

1. Its hydrology analyses are not based on sound science or sound assumptions.
2. It does not provide a direct assessment of the reliability of the project.
3. It holds the depletions in the hydrological modeling to 2020 levels.
4. It doesn't consider lower flows in the Colorado River predicted by flow changes at 2050 ranging from -7 percent to -27 percent from Udall and Overpeck and -14 percent to -31 percent from Milly and Dunne.

8. Ibid.
9. Harding, B., "Memorandum to Conserve Southwest Utah: Lake Powell Pipeline, Draft Environmental Impact Statement", Lynker Technologies LLC, July 28, 2020, pages 6-18, full text in Appendix C.

5. It has some of the same methodological shortcomings found in the 2012 Supply and Demand Study.

The DEIS is also deficient because it doesn't describe the current situation where the Colorado River can't even meet the current uses and that shortages are already occurring. The fundamental legal guidance on Purpose and Need Statements come from the NEPA CEQ Code of Federal Regulations, Section CFR §1502.13, which states that the Purpose and Need Statement:

> *"shall briefly specify the underlying purpose and need to which the agency is responding in proposing the alternatives including the proposed action." Also, from: 40 CFR 1500.1 Purpose (b): "NEPA procedures must insure that environmental information is available to public officials and citizens before decisions are made and before actions are taken. The information must be of* ***high quality****.* ***accurate scientific analysis****, expert agency comments, and public scrutiny are essential to implementing NEPA."* (emphasis added)

The DEIS purpose and need are not clear, not of high quality, and lack scientific analysis. It is questionable for BOR to change the purpose of the LPP project from a need for water to a need for a second source of water.

ES-4 Alternatives, page 4.

> *"Two non-LPP alternatives were considered but eliminated from detailed analysis, along with seven LPP variations on the pipeline or associated facilities. These alternatives were eliminated based on the factors found in Interior's NEPA regulations at 43 Code of Federal Regulations (CFR) 46.420(b). Three alternatives were brought forward for detailed analysis: the No Action Alternative (required by NEPA), the Southern Alternative (preferred alternative), and the Highway Alternative."*

Coalition: BOR did not follow the guidance in *43 Code of Federal Regulations (CFR) 46.420(b)* in developing the DEIS. The DEIS is deficient because the BOR arbitrarily dropped consideration of a viable, reasonable water conservation alternative to the LWA and for these reasons:

1. It only analyzed a very narrow "No Action" alternative and two pipeline construction alternatives and must consider a reasonable water conservation alternative.
2. It failed to evaluate reasonable alternatives to the proposed pipeline that would avoid or minimize adverse effects. It is not reasonable to reject water conservation alternatives because they do not provide a "second source" of water. BOR declared every alternative must provide 86,000 AFY of water from a "second source" outside the Virgin River watershed, based on their assumptions of a "reserve buffer" to provide water in 2060 for:
    a. their population projections in 2075 of 594,660 (which are lower in recent projections);
    b. a very high consumption rate of 240 GPCD; and

c. "system loss" of 15.4 percent.[10, 11]

3. Contrary to NEPA regulations[12] BOR also declared that they couldn't consider alternatives that involved requirements that BOR was not able to enforce:

> *This DEIS has been prepared in response to the Proposed Project and does not attempt to compel Washington County residents to modify, change, or curtail their current culture, lifestyle or social expectations.* [13]

BOR also refused to consider any progress in water conservation beyond 240 GPCD in 2045 because it was too far in the future, even though BOR was willing to project population 15 years beyond the 2060 projections developed by the Gardiner Institute to justify a "reserve buffer." Thus, BOR has joined the proponents in their efforts to inflate the need for the LPP.

ES-4.1 Comparison of the Action Alternatives, page 4.

> *"Another similarity between the two action alternatives is the LPP water exchange contract with Reclamation. Under the exchange contract, the UBWR would forbear the diversion of a portion of the natural flows to which the UBWR is entitled and allow these flows to contribute to meeting the Endangered Species Act Upper Colorado River Recovery Implementation Program requirements in the Green River. In exchange, the UBWR would deplete an equal amount of water released from Flaming Gorge Dam throughout the year and available at Lake Powell. This exchange contract would not entitle the UBWR to call for releases from Flaming Gorge."*

Coalition: The BOR cannot approve the proponents' water service contract (Contract) to buy water for the LPP using this DEIS because it requires the U.S. Congress to approve the transfer. Most importantly, the source of the water for the LPP is Flaming Gorge Reservoir, and this analysis is missing from DEIS.

The DEIS is not sufficient because it doesn't explain the water exchange in detail, nor how that contract might affect the Green River endangered fishes. Therefore, there is no baseline data to compare the two action alternatives to the No Action alternative. We suspect there isn't any water to exchange. The proponents have not disclosed where this water is located that will be equally exchanged, or whether the LPP junior water right has sufficient priority to be a benefit to

---

10. On July 16, 2020, the Council on Environmental Quality issued a Final Rule amending its NEPA regulations, found at 40 C.F.R. Parts 1500-1508. See Update to the Regulations Implementing the Procedural Provisions of the National Environmental Policy Act, 85 Fed. Reg. 43304 (July 16, 2020) ("CEQ Final Rule"). While the CEQ Final Rule, which becomes effective September 15, 2020, makes a number of revisions and clarifications to regulations applicable to the LPP EIS process, it does not, nor can it, change the substantive statutory duties and obligations required of Reclamation under NEPA. Furthermore, to the extent that the CEQ Final Rule "updates, modernizes, and clarifies" CEQ's NEPA regulations in a legally defensible manner, it does so consistently with the wealth of case law and federal agency experience developed over the past fifty years, including the cases and guidance cited herein. Reclamation has no legal obligation to apply the CEQ Final Rule, which is subject to considerable criticism and potential challenge, to the LPP. To the extent it does, and interprets the CEQ Final Rule to alter longstanding standards by which this Project has been assessed up to this late stage, after a decade of consideration in various forms and production of a DEIS under existing regulatory standards, it could, in the Lake Powell Pipeline Coalition's opinion, invite significant risk of judicial review on procedural grounds.
11. DEIS Purpose and Need Report Appendix B, 6.2.1. Demographic Projections, page 12.
12. 40 CFR § 1502.14 Alternatives including the proposed action. An EIS must assess impacts of proposal, including "reasonable alternatives not within the jurisdiction of the lead agency."
13. DEIS page 15.

those Green River endangered fishes for the 50-year term of the Contract. The Proponents are planning on using this DEIS to approve the Contract, yet the DEIS provides no analysis of the Contract's agreement.

The BOR cannot use the Contract and compare it in the alternative analysis if there is no baseline data disclosed. (NEPA 40 CFR 1502.14 (b))

Utah has to buy federal *project water* for the LPP from the Flaming Gorge Reservoir. With the CRSP already operating at a deficit, how can BOR sell more water out of CRSP when the BOR already cannot meet the Colorado River Compact allocations? The analysis of the Contract and how it will be implemented in a shortage must be included in the DEIS.

See further comments on Flaming Gorge Reservoir in Section 3.2.12 below because we suggest as water declines due to warming temperatures there isn't any water left in Flaming Gorge Reservoir for the LPP. One of the primary purposes for the Flaming Gorge Reservoir was to capture runoff and store water to meet the obligations of the 1922 Colorado River Compact allocation to provide water to the Lower Basin and this allocation is senior to the LPP water right.

1.1 Project Background, page 6.

> *"Use of Utah's Upper Basin water retained for LPP would be put to use in the Lower Basin, although still within the boundaries of Utah. Scoping comments from some states question whether Upper Basin water can be put to use in the Lower Basin but even within the boundaries of the Upper Basin state. The Project Proponent is addressing this question with the Colorado River Basin States."*

Coalition: The DEIS is not sufficient because it only has one very vague sentence on this questionable basin transfer. Most importantly, the LPP water right appears to violate the 1922 Colorado River Compact. The BOR did not disclose a 2017 letter from Arizona's Department of Water Resources to the Utah Division of Water Rights that notes its concern that this transfer violates the Colorado River Compact.[14] Further, pursuant to the Colorado River Compact and laws governing interstate agreements, before this transfer can be valid, it has to be agreed to by the other Colorado River basin states and by the U. S. Congress. With Colorado River shortages already occurring, an agreement may not be likely.

The proponents do not have a valid water right for the LPP that complies with the 1922 Colorado River Compact; this must be part of the analysis in the DEIS. A comment in a FERC study #19 described the importance of having water availability for the project's purpose. FERC's Study plan describes the nexus of water availability to the Project purpose as follows:

> *"[t]he availability of water for the pipeline would affect the ability of the Project to supply water to communities in Utah and to generate power. Therefore, the availability of water supply is directly related to the Project's purpose."*[15]

14. UDWRi, Exhibit A, letter from Thomas Buschatzke, Director of the Arizona Department of Water Resources to Eric Millis, Director of UDWRe, dated July 18, 2017, at: https://www.waterrights.utah.gov/docImport/0624/06246283.pdf.
15. FERC Climate Change Study Plan #19, Section 19.5, p. 3-1. The Study Plan Water Availability

Therefore, an analysis in the DEIS of water availability for the LPP is critical to the proposed action and this analysis is missing.

The DEIS is deficient because it violates NEPA[16] by not including this analysis.

The BOR and the proponents have known about this issue for a very long time and have done nothing to resolve it. It seems that the proponents and the BOR are continuing the DEIS process despite any concerns that the basin water transfer violates the 1922 Colorado River Compact and that it needs congressional approval. This information should not be hidden from the public and decision makers.

The DEIS is deficient because it violates NEPA.[17]

1.2.1 Need for the Project, page 9.

> *"Under median climate change scenarios, approximately 86,000 acre-feet of water will be needed annually by 2060 to satisfy increased water demands of a growing population in Washington County, Utah (Appendix B, Purpose and Need Report). A more diverse and secure water supply is needed to mitigate vulnerabilities to unexpected demand and supply scenarios and ensure reliable water deliveries into the future (UBWR 2019, Attachment C). 1.2.2 Project Proponent's Objectives. The UBWR proposes building the LPP to meet future water demands through 2060 and beyond. In addition, the LPP is intended to achieve other prudent planning objectives, consistent with the UBWR's mission (UBWR 2019, UDWRe 2019), which include:*
>
> *1. "Diversifying the regional water supply portfolio by providing a second source of water for Washington County;*
>
> *2. "Providing for system reliability by developing a secure source of water;*
>
> *3. "Providing for system redundancy in the event of system failure due to disasters or aging infrastructure;*
>
> *4. "Accounting for climate change scenarios; and*
>
> *5. "Accounting for long-term uncertainty when considering the summed effect of the vulnerability to the water supply. Other large water districts/suppliers in Utah that operate and maintain some of Reclamation's federal projects have similar objectives in both their day-to-day and long-term plans (e.g., Jordan Valley Water Conservancy District 2019)."*

16. 40 CFR § 1502.22: Agencies must disclose when information is incomplete or unavailable and whether it is essential to a "reasoned choice among alternatives."
17. 40 CFR § 1500.1(b) NEPA's purpose is to ensure that environmental information is available to decision makers before decisions are made; it emphasizes that "accurate scientific analysis" is "essential."
40 CFR § 1502.15 Affected environment. "The environmental impact statement shall succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration."
40 CFR § 1502.16: regarding "irreversible or irretrievable commitments of [water] resources."
40 CFR§ 1508.25 Does not accurately define the scope of the project where the water for the project is coming from.

Coalition: It is not clear how these arbitrary requirements were established in 1.2.1. Need for Project. These provisions are not in the Utah Division of Water Resources' mission or the Utah Board of Water Resources mission. The Utah Division of Water Resources' mission is:[18]

> *"The Utah Division of Water Resources is the water resources authority for the state of Utah and is committed to identifying and implementing water management, conservation and development strategies to satisfy the state's future water needs. With Utah's population expected to double during the next 30 to 40 years, meeting future water needs will require a balanced approach of improved water conservation, enhanced efficiency of our current infrastructure and strategic development of new projects."*

And the mission of the Utah Board of Water Resources, which is applying for permission for the LPP is:

> *"The Board of Water Resources is comprised of eight appointed individuals who represent Utah's eight River Districts. The Utah Legislature grants the board specific powers and duties per state code. The Board meets about every 45 days to discuss and vote on project approval, committal of funds, and receive project updates."*

Here, BOR states an arbitrary requirement that any alternative has to meet: *"The purpose of the Proposed Project is to deliver a reliable annual yield of approximately 86,000 acre-feet of water per year from outside the Virgin River Basin into Washington County to meet projected water demands in 2060."* It is unclear how the BOR determined it would adopt the proponents' new criteria in DEIS 1.2.1 and 1.2.3. Was it a resolution from UDWRe and UBWR that BOR used for this new requirement for a "second source" of water that any other alternative has to meet? For instance, the DEIS 1.2.1 Need for the Project, page 9, states:

> *"Under median climate change scenarios, approximately 86,000 acre-feet of water will be needed annually by 2060 to satisfy increased water demands of a growing population in Washington County, Utah (Appendix B, Purpose and Need Report). A more diverse and secure water supply is needed to mitigate vulnerabilities to unexpected demand and supply scenarios and ensure reliable water deliveries into the future (UBWR 2019, Attachment C)."*

The BOR gave up its responsibility in the Federal Code of Regulations 43 CFR § 46.420 because the BOR instead abrogated it to the proponents to produce a very biased DEIS. The BOR did not vet the proponents' claim that they needed water now and allowed them to require a "second source" as part of the Purpose and Need statement. The Federal Code of Regulations 43 CFR § 46.420 identifies the correct role of the BOR being the lead agency, but the BOR didn't follow the law in developing this DEIS for these reasons:

1. It introduced an arbitrary new "requirement" that Washington County needs a "second source" of water and then made this a critical purpose and need for the LPP, thus rejecting any possible water conservation alternative.

18. UDWRe website at: https://naturalresources.utah.gov/water-resources.

2. The BOR ignored the scoping comments in developing the DEIS as articulated in detail in our comments on the scoping report (Appendix B.)
3. BOR is allowing the proponents to use a water right that may violate the Colorado River Compact and is not requiring them to have a valid water right for the project.
4. BOR allowed the proponents to use a very flawed Alternatives Development Study Report #22[19] (written by UDWRe) that claimed that a water conservation and local supply alternative would cost $3.3 billion when just a few years earlier, it was estimated by the proponents to cost half that.[20] The BOR did not vet this flawed Study Report #22 and it was used as a basis to evaluate all of the 23 resource 2016 Study Reports. The proponents falsely claimed, without evidence, in Alternatives Development Study Report #22 that we would run out of water by 2024, have to treat water with RO, and require all landscaping to be hard surfaces. Clearly, this is not the case; all the 2016 reports were flawed and not updated with new data.
5. It did not consider all the water supplies that would be available in the future in Washington County. (See Coalition's comments in Section 2.1.3 Alternatives Considered but Eliminated from Detailed Analysis, 2.1.3.1 Alternatives Developed during the U.S. Federal Energy Regulatory Commission Licensing Process.)

The Federal Code of Regulations 43 CFR § 46.420[21] describes how a responsible public officer should have overseen the development of the DEIS. Still, the BOR failed to do so because it let the proponents take control of the DEIS process without any oversight or any credible professional analysis. The BOR did not rigorously explore reasonable alternatives.

The Coalition questions whether a "second source" of water can be a primary purpose and need for the Lake Powell Pipeline. There is no evidence provided by the proponents that they even have a valid water right for a permanent water project. Further, claiming that the over- allocated Colorado River will solve the problem of providing water to Southern Utah is not analyzed in the DEIS. The proponents continue to make claims without providing any evidence of their claims. The LPP will not meet the stated purpose and need, and the reliability is not addressed in the DEIS. The water supply analysis overestimates the reliability of the project being able to provide water for the LPP.

Also, see comments on why the LPP is not a reliable source of water in the Lynker memorandum in Appendix C.

1.2.3 Project Purpose, page 9.

> *"The purpose of the Proposed Project is to deliver a reliable annual yield of approximately 86,000 acre-feet of water per year from outside the Virgin River Basin into Washington County to meet projected water demands in 2060."*

19 Utah Board of Water Resources, "Lake Powell Pipeline, Draft Study Report 22, Alternatives Development", Revised November 2015, at: https://conserveswu.org/wp-content/uploads/2018/05/FERC-22-Revised-study-report-Alternatives-11-30-15.pdf.
20. Utah Board of Water Resources (UBWR). 2019. "Lake Powell Pipeline, UBWR Reply to Comments, Attachment C, Water Needs Assessment: Water Use and Conservation Update, Response to Comments", January 17, 2019.
21. Terms used in an environmental impact statement, at https://www.law.cornell.edu/cfr/text/43/46.420.

Coalition: The BOR makes an arbitrary rule that asserts that a "second source" of water, beyond an entire Virgin River watershed, is necessary for water security. Thus, conservation alternatives are rejected out of hand. It justifies the need for a second source based on forecasts of reduced flows in the Virgin River, ignoring similar reductions to the Colorado River. Indeed, Colorado River water users already face shortages The BOR analyzes impacts of LPP on Lake Powell, but never analyzes the reverse, whether Lake Powell can reliably provide water for the LPP. In many years the project will almost certainly be limited to low or no yield at all.
The BOR provides no explanation or justification in the DEIS for how large a watershed should be to qualify as "reliable," or when a community needs a "second source"; in fact, there would still be just a "single source" of water—an over-allocated Colorado River watershed.

1.3.3 Bureau of Reclamation, page 10.

> *"The decisions to be made by Reclamation are whether to: (1) enter into an LPP water exchange contract with the UBWR; and (2) issue an easement for the use of its lands for the intake and pumping plant at Lake Powell. The decisions would be the same for both action alternatives. These actions would be pursuant to the Reclamation Act of June 17, 1902 (32 Stat. 388), the acts amendatory thereof and supplementary thereto; the Colorado River Storage Project (CRSP) Act of April 11, 1956 (43 USC §620, et seq.); and the Reclamation Project Act of 1939, Section 14 (43 USC §389). The LPP water exchange contract and easement would need to comply with and further the purposes of the CRSP Act and the Reclamation Project Act."*

Coalition: The DEIS is deficient because it does not detail the water exchange contract with the proponents:

1. It doesn't explain the terms of the Contract in a shortage, nor outline any other problems with the water exchange contract for its 50-year term.
2. It doesn't evaluate BOR's responsibility to manage the Lower Basin Structural Deficit or explain how selling more water out of a system that is already in shortage is wise management decision without any analysis of declining water supplies.
3. It failed to discuss BOR's responsibility implementing the Drought Contingency Plan, the Interim Guidelines, and how these plans might affect water availability for LPP for the 50-yr BOR service contract.
4. It failed to consider the withdrawals of the other Upper States and their effect on the LPP water right.
5. It failed to include an analysis of how the Contact affects the UCRBRIP.
6. It failed to disclose that BOR has to follow its own 2007 Final EIS of the Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead (Interim Guidelines EIS)[22] that manage the Colorado River. BOR must therefore analyze in the DEIS how the Interim Guidelines could affect water for the LPP.

22. https://www.usbr.gov/lc/region/programs/strategies/RecordofDecision.pdf

Regarding the Upper Colorado River Basin Recovery Implementation Program (UCRBRIP)

UDWRe claims they will provide a certain amount of water for Green River endangered fishes if they can have the same amount of water out of FGR. The Coalition is concerned that the Upper Colorado River Basin Recovery Implementation Program has not evaluated this claim for BOR's two water service contracts to the State of Utah. Furthermore, the Coalition is concerned that there has not been an analysis of the CUP's water right (500,000 AFY diversion)[23] and the remaining Water Right No 41-4379, 447,000 AFY (diversion) water right because they both are depending on the unreliable seasonal high-water flows of the Green River tributaries. Moreover, they are both junior to more senior water rights. This means, as water supplies decline, they are at risk of being shut off. Therefore, it is not reasonable or likely that UDWRe will be able to provide any assurance that water would be left for the Green River fishes because of the junior status of the water right for 50-year term of water exchange contract. Further, the CRSP also depends on spring run-off to meet the Upper Basin's obligation to the Lower Basin at Lee Ferry and deliver 7.5 MAFY and water for Mexico.

Drought Contingency Planning

The DEIS failed to do an analysis of the Drought Contingency Plan and how it could affect water deliveries for the LPP. In 2012 when the initial FERC draft study reports were completed for UDWRe, both the Upper and Lower Basin states were operating under an agreement on potential Colorado River shortages, known as the 2007 Interim Guidelines, that do not consider climate change. By 2015, when all of the draft study reports were revised and resubmitted to the UDWRe, the Lower Basin States had just begun a planning process to develop the Drought Contingency Plan (DCP).[24] The DCP was undertaken due to drought conditions reducing the flow of the river and to provide a bridge to the 2007 Interim Guidelines.[25] We mention this brief history because the original analyses were made on the best available data at the time. However, with the passage of eight years, it is important to include the most up-to-date science in order to address newly relevant policy concerns in the DEIS.

On October 5, 2018, the Bureau of Reclamation published the Upper and Lower Basin DCPs in final draft form. In Section A of the DCP, which discusses the background of the planning process, it states:[26]

> *"Based on the actual operating experience gained after the adoption of the 2007 Interim Guidelines and emerging scientific information regarding the increasing variability and anticipated decline in Colorado River flow volumes, the Parties recognize and acknowledge that those relying on water from the Colorado River System face increased individual and collective risk of temporary or prolonged interruptions in water supplies, with associated adverse impacts on the society, environment, and economy of the Colorado*

23. The Utah Division of Water rights, to BOR for the Central Utah Project, Water Right No 43-3822, at https://www.waterrights.utah.gov/asp_apps/wrprint/wrprint.asp?wrnum=43-3822
24. See at: http://www.cap-az.com/documents/meetings/2017-01-05/1604-10. percent20DCP percent20and percent20DCP percent20Plus percent20Presentation percent20for percent20January percent20Board percent20meeting.pdf.
25. See at: https://www.usbr.gov/dcp/docs/DCP_Agreements_Final_Review_Draft.pdf.
26. BOR, "Agreement Concerning Colorado River Drought Contingency Management and Operations, Companion Agreement - Final Review Draft - 10.5.18", p. 6. See at: https://www.usbr.gov/dcp/docs/DCP_Agreements_Final_Review_Draft.pdf.

> *River Basin. Therefore, the Parties have agreed that it is necessary and beneficial to pursue additional actions beyond those contemplated in the 2007 Interim Guidelines to reduce the likelihood of reaching critical elevation levels in Lake Powell and Lake Mead through the Interim Period."*

Taking water out of Lake Powell for the LPP will conflict with the goal of the DCP that requests measures and invests millions of dollars to leave water in Lake Powell.

The Secretary of the Department of the Interior (Secretary), acting through the Bureau of Reclamation, adopted specific interim guidelines for the Colorado River, particularly under drought and low reservoir conditions. The eight-year period from 2000 through 2007 was the driest eight-year period in the 100-year historical record of the Colorado River.[27] This drought/climate change has reduced Colorado River storage. It creates a higher probability of shortage due to depleted storage conditions in these reservoirs. In 2018 the inflow into Lake Powell was projected to be only 3 MAFY and not the assumed 7 MAFY. These guidelines do not take into consideration climate change and will expire in 2026. Discussions between the states about new guidelines have already begun.

The Interim Guidelines describe that water in Lake Powell and Lake Mead will be managed jointly, and water will be sent to Lake Mead to prevent a shortage. The goal is to balance storage in Lake Powell and Lake Mead. Actions will be taken according to the elevations for Powell and Mead set in the Interim Guidelines. The releases from Lake Powell continue to exceed inflows into Lake Powell, reducing storage. This agreement called for the Lower Basin states to implement staged reductions in their withdrawals if Lake Mead falls below the series of defined tipping points.

John Fleck mentions in his book, Water is for Fighting Over: and Other Myths about Water in the West, what Michael Connor, BOR, told him about these reductions. An excerpt from his book:[28]

> *"As Lake Mead drops, rules kick in that require water users in Nevada, Arizona, and Mexico to remove less water from the system each year. But those reductions are modest, and Connor told me that the Bureau's worst-case modeling showed that even with the agreed-upon reductions, Lake Mead could quickly drop past a point of no return, to levels at which the current rules would be no help in determining who was entitled to how much."*
>
> *"The solution is, in a sense, straightforward. Everyone in the Colorado River Basin has to use less water. It's possible to apply a simple arithmetic wave of the arm and say, for example, that we could bring the system into balance if everyone used 20 percent less water than they are consuming today. We know from experience, from Yuma to Las Vegas to Albuquerque, that such reductions are possible, that water-using communities are capable of surviving and even thriving with substantially less water than they use today. But no one will voluntarily take such a step without changes in the rules governing basin*

27. Bureau of Reclamation, "Record of Decision Colorado River Interim Guidelines for Lower Basin Shortages and the Coordinated Operations for Lake Powell and Lake Mead", December 2007, at: https://www.usbr.gov/lc/region/programs/strategies/RecordofDecision.pdf.
28. Fleck, J., Water Is For Fighting Over and Other Myths About Water In the West, Island Press, 2016.

water use as a whole to ensure that everyone else shares the reductions as well—that any pain is truly shared. We need new rules. Absent that, we simply end up with a tragedy of the commons."[29]

Structural Deficit

An imbalance in Lake Mead between inflows and outflows is known as the Lower Basin's *structural deficit*. Eric Millis, former director of UDWRe, gave a presentation at the Utah Water Users Workshop in March 2018 on the structural deficit in existing Compact agreements.[30] The problem is that decision makes allocated more water than is provided annually. There is more water going out of Lake Mead than the amount of water going into Lake Mead reducing the storage.

According to Mr. Millis, given average annual apportionments to the Lower Basin of 7.5 MAFY, the allotment to Mexico from the Upper Basin of 750,000 AFY, with a normal 8.23 MAFY release from Lake Powell, Lake Mead storage declines about 12 feet each year. To make the problem worse, Mr. Millis explained, a provision in the Interim Guidelines triggered by low elevations of Lake Mead could lower Lake Powell by 20 feet. This could create problems in Lake Powell because it may drop the level of Lake Powell below the elevation where it could generate hydropower. These provisions could also cause the Lower Basin to accept shortages, which would lower Lake Powell even more under the 2007 Guidelines to provide water for Lake Mead. The provisions in the Interim Guidelines could affect taking water out of Lake Powell for the LPP.

Bradley Udall's 2017 article further describes how the Central Arizona Project (CAP) adds to the structural deficit and it explains how the CAP depends on equalization flows from Lake Powell because there was not enough remaining unallocated Lower Basin water. The CAP is delivering about 1.5 MAFY and also depends on excess runoff. An excerpt from this article:

> *"In the Lower Basin, Arizona could theoretically lose its water allocation for the entire Central Arizona Project canal, a critical $4.4B, 530 km cross-state 2 bcm/yr water source for 4.7 m people, multiple sovereign Indian nations, and over 120,000 irrigated hectares [Glennon, 1995; Colorado River Basin Stakeholders, 2015]. This canal currently relies on occasional but uncertain 'equalization' releases from Lake Powell that only occur with irregular and rare large Powell inflows. The extra water is delivered when Lake Powell reaches levels substantially higher than Lake Mead, a use allowed under the 1922 Colorado River Compact section III (e) and formalized most recently under rules established in a 2007 Record of Decision for coordinated operations of Lakes Powell and Mead and for shortage sharing in the Lower Basin [Department of Interior, 2007]. Under normal operating rules, without these extra inflows, Lake Mead has excess outflows of 1.5 bcm per year, the so-called Lower Basin ''structural deficit'' [Collum and McCann, 2014]. The structural deficit was created in 1968 when Congress authorized the Central Arizona Project (CAP)…Arizona agreed to rely on this unused, but in the long*

29. Fleck, J., Water is for Fighting Over: and Other Myths about Water in the West, Island Press, 2016.
30. Millis, E. Presentation at Utah Water Users Workshop, March 2018, http://conserveswu.org/wp-content/uploads/Eric-Millis-pp-2018.pdf.

run unreliable water, because there was not enough remaining unallocated Lower Basin water. The CAP had long been a desire of Arizona and the state was willing to make this bargain despite its flaws [Johnson, 1977]. This same water is first available for use by the Upper Basin under the Colorado River Compact, but heretofore has not been developed for Upper Basin use. A plan to augment the Colorado River with flows from outside the basin, discussed during the hearings on the legislation, but not included in the final package due to opposition from potential source areas, was never revisited by Congress. Reclamation in 2011 said that such augmentation was now unlikely. The structural deficit only became a problem when the CAP was fully completed in the mid-1990s combined with the drought that began in 2000. Upper Basin demand growth has also played a small role, although Upper Basin demands are still much less than forecast in 1968 for the year 2000 [Tipton and Kalmbach, Inc., 1965; Johnson, 1977]. The recent Lake Mead declines are strongly influenced by this imbalance, and solutions to this deficit have been a recent focus of the Basin states and federal government [Central Arizona Project, 2016; Davis, 2016]."[31]

In the DEIS the BOR ignores its own studies on the Colorado River. It is well documented that there is more water allocated from the Colorado River than the river produces annually, even without considering climate change impacts on diminishing future flows. According to the Bureau of Reclamation (BOR), water demand for Colorado River water has outstripped supply since 2002 The Bureau of Reclamation indicated in a study the "*apportioned water following the Law of River exceeds the approximate 100 year average 'natural flow' of the river of 15 million acre feet year (MAFY) at Lee Ferry and is 16.4 MAFY.*"[32] (The "natural flow" is estimated in hydrological modeling as what the unregulated, un-diverted streamflow would have been, absent human intervention.) "*The Basin faces a wide range of plausible future long-term imbalance between supply and demand. This imbalance computed as a 10-year running average ranges from no imbalance to 6 MAF with a median of 3.2 MAF in 2060.*"[33]

Compounding the problem is that river flows at Lee Ferry during the last 15 years have only been 12.5 -13 MAFY. Yet, these diminishing flows are not used in forecasting water availability for the LPP by Utah, the Upper Basin River Commission, or BOR. Unfortunately, BOR appears to be supporting more diversions even if the water is not physically available, putting communities at risk.

Bradley Udall and Jonathan Overpeck's 2017 research article explains the risks of lower flows for the Upper Basin States:[34]

---

31. See at: http://conserveswu.org/wp-content/uploads/Udall_et_al-2017-Water_Resources_Research.pdf.
32. Colorado River Basin Stakeholders Moving Forward to address Challenges identified in the Colorado River Basin Water Supply and Demand Study, Phase 1 Report: Executive Summary, Bureau of Reclamation, May 2015. and https://www.usbr.gov/lc/region/programs/crbstudy/FactSheet_June2013.pdf
33. Colorado River Basin Stakeholders Moving Forward to address Challenges identified in the Colorado River Basin Water Supply and Demand Study, Phase 1 Report: Executive Summary, Bureau of Reclamation, May 2015, page 3.
34. Udall, B and Overpeck, J. "The Twenty-First Century Colorado River hot drought and implications for the future", AGU Water Resources Research, 4 March 2017, pages 2404, 2407, at http://conserveswu.org/wp-content/uploads/Udall_et_al-2017-Water_Resources_Research.pdf.

"2000 and 2014 annual Colorado River flows averaged 19 percent below 1906-1999 average, the worst 15-year drought on record. One third or more of the decline was likely due to warming."

"The Upper Basin also has serious issues, one of which ripples into the Lower Basin. Under such low reservoir conditions, there is also a high likelihood that the Upper Basin states would have to curtail existing water deliveries to cities such as Denver, Colorado Springs, Albuquerque, and Salt Lake City in order to make required deliveries to Lake Mead. Heretofore, largely because of the structure of the Colorado River Compact, the Upper Basin and Lower Basin have been managed separately. With permanent flow declines of approximately 20 percent, however, the required deliveries to Lake Mead would become a hardship on the Upper Basin, as well as create Lower Basin delivery shortages [Reclamation, 2007; Barnett and Pierce, 2009; Rajagopalan et al., 2009]. The original compact, signed during one of the wettest periods in the last 450 years [Woodhouse et al., 2006], did not envision how large scale flow declines would be managed between the basins, and such declines could cause an allocation crisis between the Upper and Lower Basins [Adler, 2008]."

Utah has over-promised water to communities across the state in the Colorado River Upper Basin, water that is no longer in the system. People own property worth millions of dollars thinking they have water, and there isn't any.

A 2014 Deseret News article Utah's water managers explain the over allocation of its water. [35]

"The Water Question: The staggering problem of determining water rights.

"'Your paper water right may look very big and supply everything you are asking, but the wet water, in reality, can be very different,' Kent Jones, the state engineer over water rights, said:

"'The Colorado River, for example, holds 1.4 million acre-feet of water for Utah to put to use. There are applications approved for more than 2 million acre-feet, and about one half of that is currently in use.' Jones said the imbalance has yet to be a problem because the water has not been developed — but the struggle will come with time, and those holding 'junior' rights will go wanting.

"Many of the files are outdated, which means there could be a big difference between what is in the file — paper water — and the actual water that exists or is available — wet water.

"'We are growing so much as a state and there is so much demand for water, it is critical we know where these existing uses are and protect them,' said

35. See at:http://www.deseretnews.com/article/865617715/The-water-question-The-staggering-problem-of-determining-water-rights.html; 2014 by Amy Joi O'Donoghue.

Mike Styler, executive director of the Utah Department of Natural Resources. 'And there is really no new water to be had.'

"Why should Utahns care? Because the nature of water rights is that there <u>are far more rights than the water that actually exists,</u> so the task is to determine what is real and what is not. [emphasis added]

"Of the 15 major watershed areas in Utah, just two of them have been researched and adjudicated, which means that the investigation and documentation work was carried out and a judge then issued a decree."

The State's web site of the Upper Basin Water Rights shows 2.5 MAFY of approved depletions. But the Upper Colorado River Basin Compact only allows Utah to deplete 1.4 MAFY:[36]

- "6,450,413 acre feet diversion; and
- "2,542,092 acre feet depletions"

"Water rights can be quantified through both diversion and depletion volumes of water, in acre feet per year (AFY). A water right is permitted to 'divert' a specific amount of water, a portion of which will be returned to the river depending on its use (i.e., through agricultural return flows or municipal wastewater treatment plants). The portion of the right that is consumptively used (mostly through plant evapotranspiration) is considered 'depleted' from the basin. A depletion is defined as the part of the water that will not return to the river system. It is the amount of water that is lost from the hydrologic system based on the associated beneficial use. It is evaporated, transpired, incorporated into products or crops, and consumed by humans or livestock."

Consequently, there are significantly more approved water rights applications, which, if developed, could potentially exceed Utah's entitlement.[37] All of the authorized city water rights holders should be made aware of this over-allocation so they can implement water conservation measures to protect their water supply for the future.

Further, in 2008 Utah passed a law (Utah Code 73-3-12) in an attempt to accommodate the LPP water right that allows water agencies 50 years to prove up on their water rights and show beneficial use. This was supposed to create some security for cities that they would get water in the future. But this is a false promise due to Utah over-allocating its share of Upper Colorado River Basin. As water supplies decline, it is unclear who will be able to use the water for the long term.

Staff from the state's water agencies said one could not rely on water rights listed on this web page to determine depletions because they are not accurate. Some of these water rights were never developed. They said the staff of the River Basin Planning Section Manager at UDWRe would have a more accurate list of depletions because the depletions have to be reported to BOR.

36. See at: https://www.waterrights.utah.gov/distinfo/colorado/WRPriorityDDview.asp
37. Water Right Issues in the Upper Colorado River Basin of Utah, at: https://www.waterrights.utah.gov/meetinfo/m042005/summary.htm

However, when asked, UDWRe staff provided CSU an outdated depletion list using a water budget model.[38] CSU asked for a more specific list on what data was used for this chart so we could cross check the water right holder approved applications. However, a specific and current list was never provided. The outdated depletions estimated in Figure 1 in 2005 shows there is a significant amount of water not included in the list of categories. A staff member said a reason for the over-allocation of rivers and streams was due to not knowing how much water a stream produced and the state wanted to make sure they captured it all. For instance, Bob Fotheringham, retired Cache County Water Manager wrote in an article for the State Water Strategy Team, Your Water Your Future" that, based on the records of the State Engineer, we may be up to 6 times over-appropriated in an effort to facilitate the full beneficial use of our water resources. Further, a local water official stated that there are significantly more approved water rights applications, which, if developed, could exceed Utah's Compact entitlement.[39]

LPP water right 41-3479 should have lapsed in 2009.

BOR assigned the balance of Water Right No.41-2963 in 1995 with the understanding that any portion of this water right that Utah did not develop within 50 years of the original 1958 water right would lapse on the renewal date of Oct 6, 2009. In 2009, BOR was concerned about the Ultimate Phase water right 41-3479 and wrote in its letter protesting the issuance of Water Right 41-3479 that it should have lapsed in 2009 due to the over-allocation of senior water rights holders in the Green River tributaries. The LPP is a portion of this water right as BOR's letter states below:

> *"Water Right No. 41-3479 is a segregated portion of the Flaming Gorge water right, Application to Appropriate No. A30414. This appropriation originally included both the storage of water in Flaming Gorge Reservoir and the beneficial use thereof for the "Ultimate Phase" of the Central Utah Project. After the "Ultimate Phase" was deauthorized, Reclamation assigned this portion of the appropriation to the Utah Board of Water Resources with the understanding that any portion of this water right not developed within 50 years of the original approval date (October 6, 2009) would lapse.*
>
> *"Reclamation is concerned that further extensions of the undeveloped portions of the Flaming Gorge appropriation could jeopardize the future of the Central Utah Project (CUP). To date, over $2 billion dollars have been spent to develop the CUP, which supplies agricultural, municipal, and industrial water to millions of Utah residents in the Uintah Basin, Heber Valley, and Wasatch Front corridor. The key right for the CUP, Water Right No. 43-3822, has a priority date of November 11, 1964. If all the senior undeveloped water rights in the Green River and San Juan River Basins are developed, Utah would exceed its portion of the Colorado River Compact and the Central Utah Project water rights would be adversely impacted.*

BOR protested the extension of time for the Ultimate Phase Water Right No. 41-3479 and, for this reason, Utah made all of the Ultimate Phase water rights, which includes the right for the

38. See at: http://conserveswu.org/wp-content/uploads/Upper-Basin-DEPLETIONS-2014_Colorado_River_Compact.xls.pdf
39. Water Right Issues in the Upper Colorado River Basin of Utah: https://www.waterrights.utah.gov/meetinfo/m042005/summary.htm

LPP, junior to the Central Utah Project. All Ultimate water rights holders have to show proof of beneficial use by 2020. Note that BOR also mentioned in its protest letter that if all senior undeveloped water rights in Green River and San Juan are developed, Utah will exceed its portion of water from the Colorado River Compact.

It appears that UBWR wants to reassert its 500,000 AFY water rights and link it to the 1956 legislation for the Ultimate Phase. It is stretching the intent of the 1956 legislation. The purpose of the 1956 legislation was to build the CUP. This was done in 1964 with 500,000 AFY of diversion from the Green River tributaries. Now UBWR wants to use water right 41-3479 to draw another 447,000 AFY diversion for the Ultimate phase, relying on unused seasonal high water to divert.

These two water rights, No. 41-3822 for the CUP Initial Phase and No. 41-3479 for the Ultimate Phase account for about 977,000 AFY of runoff diversions. They are the most significant water rights applications in the state's history. A DEIS failed to do an analysis on how much runoff is available to use in the next 50-years and who has the priority status for use it for 50-years.

Therefore, before the state keeps allocating more money to the LPP, there should be a determination as to whether or not water will physically be available for the LPP over the long term. BOR could do a new Hydrological Determination using 12.5 MAFY annual natural flow at Lee Ferry to determine the long-term supply for the LPP and safe yield the state can plan on for this project.

2.1 Action Alternatives Development 2.1.1 Scoping, page 12.

> *"Many commenters requested that a "conservation alternative" be considered in the DEIS, but the only alternative with specific components that could be analyzed in sufficient detail and was submitted to Reclamation during the scoping period was the Local Waters Alternative, initially developed by Western Resource Advocates in 2013. This alternative was considered but eliminated from detailed analysis in this DEIS. No other alternatives were submitted during the scoping period."*

Coalition: The DEIS failed to include a reasonable range of alternatives. The BOR did not adequately explore the 2013 LWA as a reasonable alternative to building the LPP.

2.1.2 Criteria for Action Alternatives, page 12.

> *"To determine whether alternatives were reasonable under NEPA and should be carried forward for detailed analysis in this DEIS, each alternative was evaluated against 43 CFR 46.420(b) and was considered reasonable if it:*
>
> *"1. Met the need for the Proposed Project as described in Section 1.2.1, above;*
>
> *"2. Accomplished the purpose of the Proposed Project as described in Section 1.2.3, above; and*
>
> *"3. Was practical or feasible from an economical and technical standpoint. 13*

> *"To meet criterion 1, the alternative had to meet future water demands through 2060 with a more diverse and secure water supply, as described in the need for the Proposed Project (see Section 1.2.1, above).*
>
> *"To meet criterion 2, the alternative needed to accomplish the purpose of the Proposed Project (see Section 1.2.3, above).*
>
> *"Alternatives that did not accomplish the purpose of the Proposed Project were not considered 'reasonable' and thus were not carried forward.*
>
> *"To meet criterion 3, the alternative had to be practical or feasible from an economical and technical standpoint. If it was not, it was eliminated from further study. Economic feasibility refers to the ability to repay the cost of construction plus interest in addition to operation and maintenance charges. Technical feasibility is defined as being able to use available technologies and/or methods to successfully construct, operate, and maintain project facilities."*

Coalition: The BOR cannot make its own criteria; it has to follow the regulations for evaluating a project such as *43 CFR 46.420(b*), and it did not. BOR stated that it used regulation *43 CFR 46.420(b*) to guide their decisions on eliminating the LWA. [40] However, this regulation requires that BOR as the decision-maker do an objective evaluation of the environmental impacts of the project. The BOR failed in that responsibility and adopted the proponents' unsupported claims without evidence and adopted the proponents' more damaging alternative.

Throughout the DEIS, BOR continually seems to make up arbitrary requirements that are not based on any regulations. For example, BOR appears to be making up regulations for the purpose and need for a project and creating its own reasons for eliminating any consideration of a reasonable alternative and only identifying a choice between two other routes for the Lake Powell Pipeline as the project alternatives to be evaluated.

BOR did not follow the intent of *43 CFR 46.420(b*). The BOR should not have relied on the proponents' limiting assumptions that are clearly against the purpose of *43 CFR 46.420(b*). For an unknown reason, BOR thinks it complied with *43 CFR 46.420(b*), but it did not (DEIS 2.1.2. Criteria for Action Alternatives, page 12), for example by arbitrarily eliminating a reasonable No Lake Powell Pipeline alternative, the 2013 LWA.

2.1.3 Alternatives Considered but Eliminated from Detailed Analysis, 2.1.3.1 Alternatives Developed during the U.S. Federal Energy Regulatory Commission Licensing Process, page 13.

> *"Many comments were received regarding a water conservation. NEPA and FERC application processes. Eventually, FERC requested that the UBWR provide a detailed analysis of an action alternative that eliminated the LPP and consisted of additional conservation actions, building additional water storage, and constructing advanced treatment plants…"*

40. 43 CFR § 46.420 describes how the responsible public officer should have overseen the development of the DEIS but the BOR failed to do so because it let the proponents take control of the DEIS process without any oversight.

Coalition: During the BOR's scoping process and in the FERC process, the public made many requests for a water conservation alternative to be studied. The proponents presented the Alternatives Development Study Report #22 in 2016,[41] but it was a flawed alternative by, for example, limiting treatment of water high in TDS to only reverse osmosis, and now BOR has used it to drop any consideration of a water conservation alternative, such as the 2013 Local Waters Alternative to the LPP.

BOR ignored past Coalition comments provided to FERC about the concern that the Alternatives Development Study report #22 made false assumptions. However, the BOR did not consider the past comments made to FERC and based their decision on eliminating a water alternative because of the proponents' flawed Alternatives Development Study Report #22. It shews and undermines the entire DEIS process. Further, BOR ignored the Coalition's January 2020 FERC scoping comments[42] as well as our FERC comments on the Notice Ready for Environmental Analyses (NREA).[43]

NEPA requires that an EIS consider a reasonable range of alternatives to the proposed action. (42 U.S.C. § 4332(2)(C)) Typically, the lead agency and any Cooperating Agencies are responsible for determining which alternatives are reasonable. They must explain the rationale for that determination. However, the BOR used flawed data in Alternatives Development Study Report #22 to make its decision to drop the LWA but did not provide the report for the decision makers or the public to review.[44]

The proponents in the FERC application describe the flawed No LPP Alternative as follows:

> *"The No Lake Powell Water Alternative would involve a combination of developing remaining available surface water and groundwater supplies, developing reverse osmosis treatment of existing low-quality water supplies, and eliminating residential outdoor potable water use as a conservation measure in the (Washington County Water Conservancy District) WCWCD service area. This alternative could provide a total of 86,249 acre-feet of water annually to WCWCD and KCWCD for (Municipal and Industrial) M&I use without diverting Utah's un-allocated water rights from Lake Powell."*

Coalition: In the DEIS, the proponents continue to make false assumptions without evidence that without the LPP, the only alternative is Reverse Osmosis (RO) and the elimination of outdoor irrigation with potable water. They incorrectly base their analysis on the wrong information. The Coalition has pointed this out in past comments, as have other public commenters. This incorrect assumption is in the Final Alternatives Development Study Report, # 22, Chapter 6, Recommended NO Lake Powell Pipeline Water Alternatives for NEPA Analysis 4-20-16.[45] Then the BOR cited this false assumption in its decision to eliminate consideration of the 2013 LWA in the DEIS.

---

41. at: https://conserveswu.org/wp-content/uploads/2020/06/FERC-Alternatives-22-5-3-16.pdf
42. Lake Powell Pipeline Coalition Scoping Comments, January 2020, pages 9-15, at: https://conserveswu.org/2020/01/21/lpp-coalition-scoping-comments/
43. Lake Powell Pipeline Coalition's Notice Ready for Environmental Analyses (NREA) Comments FERC eLibrary no. 20160229-5176 (February 29, 2018). page 4. See at: https://conserveswu.org/wp-content/uploads/FERC-comments-2018-FILED-.pdf.
44. Coalition comments FERC eLibrary 20160229-5176 on February 29, 2016, The PLP Section 3.5
45. See at: https://conserveswu.org/wp-content/uploads/2020/06/FERC-Alternatives-22-5-3-16.pdf.

BOR's analysis to drop any water conservation alternative in the DEIS is therefore erroneous. Conserve Southwest Utah determined that there is significant water[46] in the watershed that could and should be considered as future supply. Therefore, the claim, without evidence, that water supplies would be insufficient by 2045 and the only available water would come from RO and that residential outdoor potable water use would have to be eliminated was not based on fact.

No Lake Powell Water Alternative, page 13.

> *"The estimated cost of this alternative was $3.3 billion (see LPP Final Study Report 22 – Alternatives Development [UBWR 2016a]).*

Coalition: In a 2019 UBWR report [47], the cost was $1.555 billion, which contradicts the price in the 2016 Alternatives Development Study Report #22 of $3.3 Billion. There was no explanation in the DEIS for the difference in cost or rationalization for why the costs in the older Alternatives Development Study Report #22 were used to eliminate any water conservation alternative and the 2019 cost estimate that is closer to the cost in the DEIS was not. BOR must revise these costs and produce a new, unbiased estimate for an accurate water conservation alternative, such as the 2013 LWA.

The DEIS continues:

> *"This alternative would satisfy water demands for the Proposed Project (part of criterion 1, meeting the need for the Proposed Project) if the above assumptions could be met but was eliminated based on the rest of criterion 1, as well as criteria 2 and 3.*
>
> *"It would not diversify the water supply because Washington County would not have a second secure, reliable water source outside of the Virgin River Basin, as described in the purpose and need statements and Project Proponents' objectives.*
>
> *"Additionally, this alternative may not be technically feasible. Repurposing outdoor potable water to indoor is not feasible because the WCWCD does not have the ability or authority to require Washington County residents to xeriscape their properties to more water efficient environments, although the WCWCD does employ landscape rebates. RO is a costly method for increasing water supply with potential adverse environmental effects related to diminished flows in the Virgin River affecting endangered fish species and also the disposal of spent brine materials.*
>
> *"Furthermore, it may not be feasible to acquire or convert all private agricultural water rights to M&I use. Some landowners may not be willing to sell or give away their water rights or land for development. It is not the disposition or mission of the WCWCD to develop or condemn land.* ***Beyond***

46. CSU presentation on water supplies Sept 17, 2018 Finance Board see at: http://conserveswu.org/wpcontent/uploads/Finance-Board-2018-Sept-17-FINAL-pp.pdf; and audio (start at 43:38 into the audio) https://www.utah.gov/pmn/files/429905.MP3.
47. UBWR FERC filing, Water Use Conservation Update. January 17, 2019, page 11, Cost of Extreme Conservation Proposal Utah Board of Water Resources, Attach C, Update Water Needs Assessment, January 17, 2019, page 11, Table 3 Costs of Extreme Conservation Proposal $1,555,000,000, at,https://elibrary.ferc.gov/idmws/file_list.asp?accession_num=20190118-5151.

> ***the criteria mentioned above, it would likely change some of the culture and aesthetics of the area, possibly reducing the desirability of the area."*** **[emphasis added]**

Coalition: It is an unfounded assumption that without the LPP, our area would likely change the culture and aesthetics of the area, possibly reducing the desirability of the area. Other communities in the west use much less water per capita, and their communities are thriving.

As we described above that the BOR could not develop its own set of criteria, it also must follow the Federal Code of Regulations and other regulations to evaluate a proposed project.

The main feature of the Local Waters Alternative is an emphasis on greater conservation. Future per-capita demand is modeled to decline by 1 percent per year – that is, every year per capita water use would decline by 1 percent based on each previous year's level of per capita water use, through 2060 (WRA 2013). This alternative has multiple components (WRA 2018):[48]

The DEIS eliminated this alternative based on criteria 1, 2, and 3.

One of reasons in the DEIS for dropping the LWA was that an annual rate of conservation 1 percent was not considered reasonable. However, a 1 percent annual decline, as used in the LWA, is, indeed, reasonable; BOR fails to explain why they think it is not. As mentioned above, the BOR cannot create its own set of rules; it has to comply with NEPA regulations.

DEIS continues with respect to the Local Waters Alternative on page 14.

> *"However, the Local Waters Alternative could partially meet the need and achieve part of the purpose of the Proposed Project (meet future water demands in 2060) if all the supply and demand assumptions can be met. One of the assumptions of the Local Waters Alternative is that the WCWCD would have to require a higher rate of water conservation (1 percent per year for 40 years) than what is found in the Proposed Project, which is 20 percent over a 40-year period. Although the WCWCD encourages conservation through conservation rebate programs, they do not have the ability or authority to require Washington County residents to xeriscape their properties to more water efficient environments or nearly eliminate outdoor water use. This DEIS has been prepared in response to the Proposed Project and does not attempt to compel Washington County residents to modify, change, or curtail their current culture, lifestyle or social expectations."*

Coalition: A 1 percent decline in water use is reasonable and explained in detail below. BOR should not use it as a reason without evidence to drop the 2013 LWA. In 2015, Washington County used 302 GPCD; by reducing demand just 1 percent each year, we could eliminate the need for 86,000 acre-feet of additional water by 2060, even using BOR's population projections.

[48] Western Resource Advocates, "Comments on the Preliminary Licensing Proposal for the Lake Powell Pipeline, Project No. P-12966-001", November 16, 2018, at: https://conserveswu.org/wp-content/uploads/2020/06/WRA-Locals-Water-Alternative-updated-2018.pdf

Summary of the 1 percent Conservation Alternative from the 2013 LWA.[49]

> *"In summary, the 1 percent water conservation alternative is a feasible and responsible solution to the water management issues facing Washington County. If implemented, it would result in total demand of 115,000 AFY in 2060, with a system-wide water use rate of 176 gallons per capita per day, similar to other communities' rates of water use today.*[50] *This section presents an analysis of future supplies for Washington County and includes both reuse (recycled) water and agricultural-urban water transfers. The reuse volume reflects the lower level of water use under the 1 percent conservation scenario. And, water supplies made available from agriculture lands is predicted to be greater than what was predicted in Draft Study Report 19. These future supplies, along with water conservation, can be phased in overtime as needed, thereby providing water managers with options that are more flexible than the Lake Powell Pipeline. This is especially important given the uncertain economic development and population growth (as underscored by the recent significant shift in GOPB population projections). Thus, pursuing additional water supplies in an incremental, diversified approach is preferable to relying on a single, large project that may unduly commit residents to high repayment obligations."*

WRA noted that the USGS has documented a national trend of declining per capita water use in the municipal sector since 2005.[51] WRA also submitted in the 2018 FERC filing an Appendix. Municipal Deliveries of Colorado River Basin Water by Pacific Institute.[52]

> *"This report documented 100 cities and water agencies in the Colorado River Basin, finding that the majority of people receiving water from the Colorado River basins live in an area where per capita deliveries dropped an average of a least one percent per year from 1990 to 2008. Some of the water agencies that achieved per capita declines of 1 percent or more per year are located in Utah, namely Salt Lake City, Provo. West Jordon, Orem. Springville and Pleasant Grove, indicating that this is a trend, are not unique to other states. Therefore, the minimal reductions to per capita water use proposed by UBWR are unrealistic and unreasonable."*[53]

BOR failed to address accurately the 2013 LWA[54] analysis submitted as a water conservation alternative. The DEIS uses the wrong baseline data for the LWA in its analysis. The 2013 LWA

---

49. at: Western Resource Advocates, "The Local Waters Alternative to the Lake Powell Pipeline", 2013, p. 23, at: https://westernresourceadvocates.org/publications/the-local-waters-alternative/
50. Western Resource Advocates. 2003. Smart Water: A Comparative Study of Urban Water Use Efficiency at: https://www.waterboards.ca.gov/waterrights/water_issues/programs/hearings/cachuma/comments_rdeir/pacific_institute/4otherreports/wra_ch3smartwater2003.pdf
51. USGS Summary of Estimated Water in the US 2015 at: https://pubs.usgs.gov/circ/1441/circ1441.pdf
52. Cohen, M., "Municipal Deliveries of Colorado River Basin Water", Pacific Institute, June 2011, at: https://pacinst.org/publication/municipal-deliveries-of-colorado-river-basin-water-new-report-examines-100-cities-and-agencies/.
53. Western Resource Advocates, "Comments on the Preliminary Licensing Proposal for the Lake Powell Pipeline, Project No. P-12966-001", November 16, 2018, page 12, at: https://conserveswu.org/wp-content/uploads/2020/06/WRA-Locals-Water-Alternative-updated-2018.pdf.
54. Western Resource Advocates, "The Local Waters Alternative to the Lake Powell Pipeline", 2013, p. 24, at: https://westernresourceadvocates.org/publications/the-local-waters-alternative/.

does not include RO. Without the correct baseline information, the analysis used by BOR to eliminate the LWA alternative is wrong. The only No Lake Powell Alternative the BOR analyzed is in the Alternatives Development Study Report #22.

The Coalition's comments in past years have described that the proponents are using flawed data to determine the conservation gain, but they continue to assert the claim, nonetheless.

DEIS continues, regarding Local Waters Alternative page 14.

> *"Conversion of agricultural water to M&I use is another component of the Local Waters Alternative. It requires at least 13,700 acre-feet of conversion to meet this alternative's projected demand, which is based on the more ambitious conservation goal. Olds (2018) estimated that up to 23,000 acre-feet of water per year would be available for conversion. However, Olds (2018) also noted that this may be the upper range of possible conversions and that it could be cost prohibitive to obtain some of those water rights. The UBWR asserts that up to 10,080 acre-feet is available for conversion without pursuing "buy and dry" programs (Final Water Needs Assessment – UBWR 2016b). Furthermore, it may not be feasible to acquire or convert all private agricultural water rights to M&I use. Some landowners may not be willing to sell their water rights for land development or cease their agricultural operations. It is not the disposition or mission of the WCWCD to develop or condemn land to obtain water rights."*

Coalition: With respect to agricultural water conversions, the DEIS uses the wrong data for its decision to eliminate a water conservation alternative because the LWA included an extreme amount of agriculture water conversion. The BOR unreasonably asserts without evidence that meeting demand of 193 GPCD, as proposed in the 2018 Local Waters Alternative, that relies only on the Virgin River watershed, would require extensive xeriscaping, including converting existing homes, and 100 percent conversion of agricultural water use to M&I use, which is not the case.

The DEIS doesn't account for all the agricultural water in the supply by not counting how much agricultural water not used by cities, whether supplied by the irrigation companies and private landowners. There is much more water that should be considered as supply that is not being counted. Therefore, there are more supplies than the proponents are accounting for in the DEIS. If we have more supplies, then the need for the LPP will go down.

Over time as agricultural lands are developed, cities acquire those rights for their secondary water systems. Projected populations cannot be housed in anything similar to current patterns without extensive development on, and conversion of water from, agricultural lands.

The 2011 Water Needs Assessment[55] estimated the amount of agricultural water to be 86,760 AFY in 1990. The WCWCD, on the other hand, only claims about 10,800 AFY of agricultural water that will convert to residential use from now to 2060. The LWA estimated about 13,700 - 35,200 acre-feet will convert to residential use from 2005- 2060. This seems reasonable because there is much more agricultural water not accounted for in supply. Some of the 86,670 AFY of

55. UDWRe, Lake Powell Pipeline Study Water Needs Assessment, March 2011, p. 4-42, at: https://conserveswu.org/wp-content/uploads/2012/04/19DraftWaterNeedsAssessmentReport-1.pdf.

water is still in the system and currently used someplace keeping something green, either a pasture, a yard, or public open space; all of it needs to be accounted as the supply for in the DEIS.[56]

Again, this is a large discrepancy in reported water supply. Some of this water has already converted to M&I, and much of the remaining will have to be treated and some will convert to culinary without treatment.

The 2016 Water Needs Assessment (WNA)[57] shows:

> *"2.5 Agricultural Conversion for M&I Supply*
> *"As municipal development occurs over existing agricultural lands, water will be converted from agricultural to municipal uses. To estimate the amount of water that might be obtained from these conversions, the State of Utah duty of water values were used. Water quality concerns and groundwater sustainability were not considered in this computation."*

The Declared M&I Supply

Table 2 shows proponents' claim that 98,528 AF of existing and future culinary and secondary water supply will be available to the county by 2060 and that it will not support the projected growth by 2045.

Table 2. Water supplies identified in the FERC study reports:	**AFY**
WCWCD - current	32,225
Cities in Washington County	35,273
WC – future (local projects)	13,670
WC – future reuse/secondary (10,000 AG/7,360 reuse)	17,360
Total existing & future supply without LPP	**98,528 (2060)**
Source: Table ES-1 Existing and Future Reliable Culinary Supplies for Washington County 2015 Water Needs Assessment)	

The 98,528 AFY available from local sources by 2060 per the WCWCD ignores many existing water supplies and those that could be developed locally in the future cited below.

However, the WCWCD claims they have plenty of water in information given to the Fitch credit agency to support its own credit rating. The Fitch report reads:[58]

> *"Fitch Affirms Washington County Water Conservancy District's, UT Water Revs at 'AA'; Outlook Stable*

56. Utah Board of Water Resources, Lake Powell Pipeline Water Needs Assessment, page 4-42, March 2011, at: https://conserveswu.org/wp-content/uploads/2012/04/19DraftWaterNeedsAssessmentReport-1.pdf.
57. UDWRe, Lake Powell Pipeline Study Water Needs Assessment, April 2016, p. 2-14, at: https://conserveswu.org/wp-content/uploads/FERC-Water-Needs-ASSESSMENT-19-5-5-16.pdf.
58. Business Wire, "Fitch Affirms Washington County Water Conservancy Dist's, UT Water Revs at 'AA'; Outlook Stable", December 18, 2015, at: https://www.businesswire.com/news/home/20151218005863/en/Fitch-Affirms-Washington-County-Water-Conservancy-Dists.

> *"December 18, 2015 01:40 PM Eastern Standard Time*
>
> *"SAN FRANCISCO--(BUSINESS WIRE)--Fitch Ratings has affirmed the following Washington County Water Conservancy District, UT (the district) obligations at 'AA':*
>
> *"About 28 percent of the district's 32,000 acre feet (af) per year of water sources is surplus and will be used to serve future growth and another 13,900 AF will come online in the next few years. The district's typical peak summer demand is 37 million gallons per day (mgd), though usage declined last year due to wet weather, and winter demand is 6-7 mgd compared with capacity of 60 mgd. The district is operating a groundwater recharge program that currently provides access to 100,000 AF of stored water and will ultimately provide up to 300,000 af."*

The LPP studies acknowledge the 100,000 AF of water in the Sand Hollow Aquifer and the possibility of 300,000 AF of water of mentioned in the Fitch credit report from the WCWCD to the credit agency. But, the WCWCD in the LPP studies only claim 4,000 AFY is the possible yield from the aquifer by 2060. This is a very large disparity in declared usable water supply that needs better disclosure by the WCWCD in the DEIS.

The WCWCD doesn't count all water supplies.

The WCWCD itself reports that the cities have additional supplies not identified as future water by the WCWCD:[59]

> *"Based on the Utah Division of Water Rights point of diversion coverage, there are 1,276 active underground water rights with points of diversion within the Navajo/Kayenta and the Upper Ash creek aquifers. These water rights claim 590 cfs or 332,760 acre-feet/year from the petitioned aquifers. Accounting for the fact that some water rights declare more than one type of use, there were 160 commercial water rights, 249 stock watering rights, 296 domestic rights, and 969 irrigation rights (DWR Database, 2000). The Utah Division of Drinking Water indicated there are 23 public water systems with 49 public drinking water wells with water quality data."*

While Washington County's water rights are over-allocated, WCWCD only claims 35,452 AFY from cities will be used as supply by 2060.[60] However, the report above reveals the cities have much more than 35,452 AFY of water which they could develop in the future. The problem is the WCWCD doesn't consider all the water supplies in the county that could convert to culinary or secondary use by 2060.

Table 3, reproduced from Table 7 in the 2013 *Local Waters Alternative* study[61], shows estimates of Washington County's future supply that include more agricultural water conversion and more

59. Washington County Water Conservancy District Petition for Classification of the Navajo/Kayenta and Upper Ash Creek Aquifers Chapter VI, p. VI-1, at: https://www.wcwcd.org/wp-content/themes/wcwcd/pdf/Classification%20Petition_2005.pdf.
60. UDWRe, "Lake Powell Pipeline Project Water Needs Assessment-FINAL", April 2016, at: https://conserveswu.org/wp-content/uploads/2018/03/FERC-Water-Needs-ASSESSMENT-19-5-5-16-1.pdf
61. Western Resource Advocates, "The Local Waters Alternative to the Lake Powell Pipeline", 2013, p. 24, at: https://westernresourceadvocates.org/publications/the-local-waters-alternative/

reuse; this is significantly more water than the WCWCD included in supply; note that the WCWCD only claims 100,000 AFY by 2060 but the LWA calculates between 116,300 and 138,000 AFY.

Table 3. Water supply alternatives from the Local Waters Alternative analysis.		
Supply Alternative	Culinary (AFY)	Secondary (AFY)
WCWCD Current Supplies and Ash Creek	78,400	7,500
Reuse	---	16,900
Agricultural Water Transfers	---	13,700-35,200
Sub-Totals	78,400	38,000-59,600
Total	**116,300-138,000**	

Additional supplies could include:

1. As agricultural lands are developed more water will become available for M&I use.
2. Increase efficiently of the WCWCD's current water projects because the water provided for use from their projects is very low.
3. Private landowners hold water rights and as they develop their land more water becomes available for development.
4. Increased reuse[62] and treatment of abundant brackish water.
5. Inventory all water resources in the county not counted by the WCWCD as supply.
6. Inventory the cities' ability to provide future water supplies not counted by the WCWCD.
7. Stormwater capture.[63]
8. Rainwater harvesting.[64]
9. Grey water.

Undeclared Local Water Supply Sources by WCWCD

In arguing the need for the LPP, the WCWCD limits what water sources it considers. However, there are many additional sources it could pursue locally, at lower risk and cost than the LPP:

- **Appropriate accounting of yield from local sources.** Estimates of yield from existing local water supplies should be reviewed by an independent body to assure that they are not being artificially limited or underestimated in an effort to justify the LPP. For

62. EPA, "Water Reuse and Recycling", 2020, at: https://www.epa.gov/waterreuse.
63. Shimabuku, M. et al., "Stormwater Capture in California: Innovative Policies and Funding Opportunities", Pacific Institute, June 2018, at: https://pacinst.org/wp-content/uploads/2018/07/Pacific-Institute-Stormwater-Capture-in-California.pdf.
64. Poindexter, J. "23 Awesome DIY Rainwater Harvesting Systems You Can Build at Home", Morning Chores, at: https://morningchores.com/rainwater-harvesting/.

example, WCWCD claims that Sand Hollow and Quail Lake reservoirs and Sand Hollow aquifer, fed from the Virgin River, can only provide about 30,000 AFY as annual supply to 2060. Elsewhere,[65] UDWRe projects 113,000 AFY Virgin River depletion to 2050—more than triple the claim of 30,000 AFY. This higher amount of water is not identified in future supplies. This is spring high-water flows that can be stored in reservoirs.

- **Inclusion of water rights from private landowners that convert from agriculture to municipal and residential development.** We do not advocate the development of agricultural land, but we do recognize that wherever agricultural land is converted to other uses, water could be converted to culinary or secondary use. More analysis is required to account for agricultural water, estimate its conversion rate, and determine its treatment costs.
- **Increased reuse and treatment of abundant brackish water.** There are several substantial sources of water considered to be too saline for M&I use. Given the current project cost of the LPP, it would seem wise to review these analyses.
- **Increased use of secondary water for yards and municipal irrigation.** Especially given the conversion of agricultural water, and particularly with the high rates of new development, it makes sense to require greater use of secondary water for landscape use. WCWCD claims it has no control over local ordinances, but it can and does have great influence on local policies with respect to water. It makes sense to consider updating local landscape regulations to require better planning for water use in new development.
- **Innovations in water management.** Other alternatives, including undeveloped city water rights, rainwater capture, more careful analysis of increased yield from the Virgin River and local reservoirs and underlying aquifers, used to seem inconsequential in terms of supply. However, these are significant water sources that are being ignored in UDWR's Water Needs Assessment for the LPP. (See comments on water supplies below.)
- **Water Use Pricing to signal conservation.** Water budget rates have been shown to reduce water use by 50 percent[66] and pay for themselves over time.
- **Better water conservation planning to lower demand.** It should use industry-standard planning and management processes to develop plans that are executable and accountable in terms of objectives, tasks, schedules, responsibilities and budget. Existing documents following current UDWRe guidance do not continue these basic elements and therefore are neither executable nor accountable. They will not result in significant water conservation, but rather contain background information on infrastructure, current usage and measures that could be taken. Conservation goals should be tied to estimates of future water supplies and what has been achieved elsewhere. Methods to reduce usage should be studied and ranked, and then incrementally implemented in projects that are planned to move us toward the goal in measurable steps.

---

65. UDWRe, "Utah Perspective, The Colorado River", 2nd Edition, May 2002, page 8,see at:https://water.utah.gov/wp-content/uploads/2019/01/TheColoradoRiverart.pdf.
66. Conserve Southwest Utah, "Water Budget Rates Workshop", held October 30, 2014, see at: https://conserveswu.org/programs/water-conservation/; see workshop summary at: https://conserveswu.org/wp-content/uploads/2014/10/Workshop-Summary-3.pdf.

The WCWCD has more than 147 water rights that are not included in the DEIS supply.[67]

Excluding Water Supply

Another way the district limits the declared water supply is by only counting water as supply that meets EPA drinking water standards in the county. Instead the studies should require full disclosure of all water resources in the county. Water treatment of the abundant lower quality water in the county would be a cheaper alternative to LPP. Water treatment costs are rapidly decreasing as new technologies and economies of scale drive the costs down as the world is forced to look to these water sources. The proponents completely omit this; per a FERC study report: *"Water supplies that meet the EPA's secondary untreated MCL for drinking water of TDS less than 500 mg/L are deemed usable for culinary purposes in this assessment."*[68] *WCWCD has been unwilling* to declare more of its storage as supply. **Examples of reducing supply to show very low yield include WCWCD's listing of reservoirs in Table 4.**[69]

Table 4. CSU description of reservoir capacity and yield.

Storage Facility	Capacity (AF)	Declared Yield (AFY)
Quail Creek Reservoir	40,000 (fills every year)	
Sand Hollow Reservoir	50,000 (fills every year)	
Total Reservoir	**90,000**	**26,922**
Sand Hollow Aquifer		
Identified	100,000	4,000 wells
Potential, from FITCH report	300,000	
Total	**390,000**	

The WCWCD is only declaring an annual yield of 7 percent of its capacity. The DEIS is insufficient because it didn't include these water supplies, including that WCWCD has more than 140 well water rights not considered as supply.[70]

2.3.1 No Action Alternative, page 20.

> *"In the absence of the LPP (i.e., under the No Action Alternative), the WCWCD would pursue other projects not listed in Table 2.3-1 that have been part of their long-term planning (WCWCD 2020). These projects may include* ***Warner Valley Reservoir*** *(includes RO treatment of Virgin River water),*

67. WCWCD change of address letter to Utah Division of Water Rights for 147 water rights, June 29, 2009, at, https://www.waterrights.utah.gov/docImport/0525/05256641.pdf.
68. Utah Division of Water Resources, Water Needs Assessment, page 2-10, 2016, at: https://conserveswu.org/wp-content/uploads/2012/04/19DraftWaterNeedsAssessmentReport-1.pdf.
69. Utah Division of Water Resources, "2015 Municipal and Industrial Water Use Data, 2019 Version 2", at: https://water.utah.gov/wp-content/uploads/2019/08/2015-MI-Data-2019-v2.pdf.
70. WCWCD change of address letter to Utah Division of Water Rights for 147 water rights, June 29, 2009, at, https://www.waterrights.utah.gov/docImport/0525/05256641.pdf.

additional wastewater reuse, water rights acquisitions, stock acquisitions, and additional agricultural conversion from development.

"It would be speculative to include these potential projects in this analysis because it is unknown which, if any, of these projects may be built by 2060 in the absence of the LPP. If any of these projects become foreseeable prior to completion of the LPP NEPA process, they would be addressed."

The DEIS is deficient because it extended the timeline out to 2075 for analysis and still doesn't count the Warner Valley Reservoir project as future supply. WCWCD has available water rights to divert up to 40,000 acre-feet of low-quality water annually from the Virgin River at the Washington Fields Diversion to be stored in a future Warner Valley Reservoir. This project will provide for more efficient storage, management, blending, and conservation of these water resources. WCWCD includes this in its future plan[71] for 2060 but doesn't identify it as future supply in the studies. The reservoir has been considered by WCWCD and its predecessors for more than 50 years. There are several technical and engineering challenges that must be overcome before the project can move forward. For example, the reservoir would store Virgin River water that is unsuitable for culinary and landscape irrigation due to contamination from TDS from local natural hot springs. In the past, treatment possibilities were limited to reverse osmosis, which is expensive and creates complicated environmental impacts (e.g., storing removed salts). However, newer technology promises more cost effective and environmentally friendly solutions to reverse osmosis and other issues associated with Warner Valley Reservoir.

The Reasons for our High Use/Demand

There are a variety of reasons for the high water use in Washington County, including our area's culture, awareness, and lack of water conservation price signals. The cultural aspect is the most difficult to understand. It could include the fact that many residents come from areas that have more abundant water where expansive lawns are normal, or historic difficulty storing water (including catastrophic dam failures). The awareness aspect is easier to understand. Generally, despite the efforts of water departments, there is very little awareness that water is precious and should be conserved. We obviously live in a desert, with many cues (desert ecosystems, low rainfall, hot summers), but there are few official signals that we should conserve water:

- Institutions (schools, churches, golf courses) and businesses are generally not landscaped in arid vegetation.
- Regulations, landscape ordinances, or requirements on water use or penalties for wasting water are largely missing.
- Communications about the need for conservation are indirect and infrequent.
- Little comparative data given to customers on their water use relative to goals and other customers is largely missing.

The biggest reason, however, is that there is no quantitative economic signal for our water departments that water has special value. Utah has some of the cheapest water rates in the country, and Washington County has some of the cheapest in Utah, despite being one of the driest counties in one of the driest states. A commodity that is priced as if it has no value is treated as if it has no value. We purposefully even hide the real cost of water by including a

71. UDWRe, "Prepare 2060, A Statewide Water Infrastructure Plan", 2018, at: http://prepare60.com/Content/SWIP.pdf

significant line item in our property taxes for water, making about half of the price of our water not dependent at all on how much we use. Utah is one of the few states with this practice. Certainly, it is against normal business practices, where infrastructure improvements must be funded from the normal revenue stream. On top of this issue is the problem that water pricing is largely disconnected from usage; our county's water rates are so low with such small price tiering that it makes no difference how much a normal home or business uses. The step increases in the rate structure are so shallow that it sends no conservation signal. There is overwhelming data that pricing is the most influential factor in water use. Water budgeting[72] is a very cheap, very fair, and highly successful way to dramatically reduce water use. The budgeted rates are structured to support the water district's revenue requirements.

2.1.3.1 Local Waters Alternative, page 15-16: Reuse.

> *"Under the Local Waters Alternative, projected reuse would need to increase by 16,900 acre-feet to meet this alternative's projected demand. By comparison, an increase of 7,300 acre-feet of reuse water is projected under the Proposed Project. The 16,900 acre-feet from the Local Waters Alternative would require upgrading the existing St. George City treatment plant beyond its current maximum design and/or building a new treatment facility to treat that much water, whereas the Proposed Project would only maximize the existing treatment plant to the designed capacity. Both the Local Waters Alternative and the Proposed Project would require additional storage to accommodate the treated reuse water.*
>
> *"Therefore, this alternative does not fully meet the need or accomplish the purpose of the Proposed Project; instead, it would likely introduce additional risk to the WCWCD's overall water supply and only provide a single source of water rather than a more diverse and secure water supply through a second source."*

Coalition: BOR claims the projected 16,000 AFY of water reuse by 2060 in the LWA is too high. Although if the community's population grows to 500,000 people, there will undoubtedly be more water than in low projections of 7,300 AFY by the proponents. Therefore, the 16,000 AFY reuse in the LWA by 2060 is reasonable and should not be reason to eliminate the LWA as an alternative.

When, in 2006, the Utah Legislature passed the Lake Powell Pipeline Development Act, it also passed the Wastewater Reuse Act[73]. The Legislature had officially authorized reuse in 1995[74]. A May 2018 reuse presentation[75] to the governor's Executive Water Finance Board (EWFB) showed that twelve reuse projects were filed in eleven years under the 1995 version of the law.

---

72. See analysis at: http://conserveswu.org/programs/water-conservation/.
73. Utah State Legislature, Wastewater Reuse Act, 73-3c-101, 2006, at: https://le.utah.gov/xcode/Title73/Chapter3C/C73-3c_1800010118000101.pdf.
74. Utah State Legislature, Utah Business Trust Registration Act, 16-15-101, 1995, at: https://le.utah.gov/xcode/Title16/Chapter15/C16-15_1800010118000101.pdf
75. Hartvigsen, D., "Why aren't we reusing more water?", Smith Hartvigsen, PLLC, at: https://www.utah.gov/pmn/files/399003.pdf

However, after the repeal of the Wastewater Reuse Act in 2006, only seven reuse projects had been filed in twelve years.

The mayor of South Jordan, Utah, also presented to the EWFB regarding her city's reuse project.[76] It was designed similar to a reuse facility in Altamont, Florida,[77, 78] that does not use reverse osmosis, and the costs are half of reverse osmosis.

We do not agree with the BOR's reasons for eliminating the 2013 LWA alternative. On a list of 19 resources evaluated in the DEIS, both LPP route alternatives have cumulative negative environmental effects, while a conservation alternative would have little or no negative effect. The National Environmental Policy Act (NEPA) was intended to move agencies such as BOR to prefer alternatives that minimize damage to the natural and human environment; however, the BOR's preferred alternative is the most damaging alternative.

2.3 Descriptions of Alternatives Carried Forward for Detailed Analysis; 2.3.1 No Action Alternative, page 20.

> *"The other projects are not developed in sufficient detail to analyze them in the No Action Alternative. The Sand Hollow Recharge and Recovery project will be developed at some point in the Sand Hollow well field. The Westside Arsenic Treatment is related to the Navajo sandstone aquifer and is not currently planned for development. The combined Groundwater Well Development projects are named and listed, but locations and numbers of wells are not known at this time. The reuse project is a current plant that could be maximized to its 11,200 acre-feet annual design capacity. Maximizing reuse through this plant does not create additional environmental effects. Finally, agricultural conversion would occur as agricultural lands are developed. However, currently each conversion location and amount of water is unknown.*
>
> *"In the absence of the LPP (i.e., under the No Action Alternative), the WCWCD would pursue other projects not listed in Table 2.3-1 that have been part of their long-term planning (WCWCD 2020). These projects may include Warner Valley Reservoir (includes RO treatment of Virgin River water), additional wastewater reuse, water rights acquisitions, stock acquisitions, and additional agricultural conversion from development. It would be speculative to include these potential projects in this analysis because it is unknown which, if any, of these projects may be built by 2060 in the absence of the LPP. If any of these projects become foreseeable prior to completion of the LPP NEPA process, they would be addressed."*

Coalition: The proposed developments for supply are not speculative because they are in the long-term plans of the proponents. The proponents have now extended the timeline to 2075. The BOR does not adequately describe the baseline of the No Action Alternative so that it could be

76. South Jordan City, "Overview of South Jordan Water Conservation Program & DPR Demonstration Project", 2019, at: https://www.utah.gov/pmn/files/505541.pdf
77. Altamonte Springs City, Florida, city website, at: https://www.altamonte.org/754/pureALTA
78. Florida Potable Reuse Commission, "Framework for the Implementation of Potable Reuse in Florida, January 2020, at: http://www.watereuseflorida.com/wp-content/uploads/Framework-for-Potable-Reuse-in-Florida-FINAL-January-2020-web10495.pdf

compared accurately. The BOR has to provide a benchmark enabling decision-makers to make a comparison of the magnitude of environmental effects of the action alternatives. This would give a clearer picture of the differences in the other options that are currently lacking.

The BOR must fulfill the agency's responsibilities of providing the baseline data of the No Action Alternative in Washington County by collecting water rights data for Washington County, by collecting water data from agricultural irrigation companies in Washington County, by collecting water right information from large land developers. The current explanation for not evaluating the No Action Alternative is not sufficient, lacks a detailed justification, including all the water supplies in Washington County, and, thus, violates NEPA.[79]

2.3.2.12 Lake Powell Pipeline Water Exchange Contract, page 27.

> *"This alternative relies upon the proposed LPP water exchange contract between the UBWR and Reclamation. Under the exchange contract, the UBWR would forbear the diversion of a portion of the natural flows of the Colorado River to which the UBWR is entitled under the Upper Colorado River Basin Compact and the Colorado River Compact of 1922 and allow these flows to contribute to meeting the ESA Upper Colorado River Recovery Implementation Program requirements in Reaches 1 and 2 of the Green River. In exchange, the UBWR would deplete an equal amount of water released from Flaming Gorge Dam throughout the year and available at Lake Powell. The exchange would assist Reclamation in meeting its ESA obligations and be in compliance with the 2006 Flaming Gorge ROD (https://www.usbr.gov/uc/envdocs/eis/fgFEIS/index.html). It would also provide the UBWR with a more reliable water supply for Washington County. This exchange contract would not entitle UBWR to call for releases from Flaming Gorge."*

Coalition: The BOR describes the water exchange contract for the Lake Powell Pipeline this way:

> *"The proposed project will not change the releases of Flaming Gorge stored water to the Green River, which will continue to occur as specified in the 2006 ROD. Therefore, effects of Flaming Gorge releases to the Green River will remain the same as those previously analyzed in existing Reclamation models and covered by the 2005 Flaming Gorge EIS."*

However, the modeling used in the 2005 Flaming Gorge EIS didn't consider that climate change will reduce future flows. Due to the use of outdated hydrological modeling it is also uncertain how much water can be sold out of Flaming Gorge Reservoir in a water service contract for the LPP.

As an example of the confusion, to clarify the issue Utah Rep. Scott Chew wants a new study, and he introduced a House Continuing Resolution HCR 23 in the 2020 Utah legislative session.

---

79. 40 CFR § 1502.14 (b) Devote substantial treatment to each alternative considered in detail, including the proposed action so that reviewers may evaluate their comparative merits.

It expressed concerns with the Flaming Gorge Dam's 2006 Record of Decision (ROD). Although H.C.R. was withdrawn it will be resubmitted in the 2021 session, it reads:

> *"NOW, THEREFORE, BE IT RESOLVED, that the Legislature of the state of Utah, the Governor concurring therein, support the creation of a new management plan that allows stakeholders to participate in a plan that allows stakeholders and endangered fish to benefit."*[80]

We agree with representative Chew that the 2006 ROD is not adequate for the management of the dam, and a new study is needed. The Coalition is concerned that the DEIS is not sufficient because it uses an outdated 2006 ROD to make decisions on the LPP water exchange contract. It also doesn't analyze the water coming from the Flaming Gorge Reservoir.

Most importantly, hydrological conditions have changed since the Flaming Gorge 2005 EIS was completed. The changes include over-allocation of water rights, reduced snowpack and stream flows, reduced storage and using an outdated hydrological model that only considers the 100-year historical flows at Lee Ferry. The model used in the Flaming Gorge EIS does not consider a changing climate over the 50-year water exchange contract. Consequently, we suggest there may not be enough water left in Flaming Gorge Reservoir for the LPP and a new study needs to be completed.

For instance, the 2005 EIS doesn't consider lower flows in the Colorado River predicted by flow changes at 2050 ranging from -7 percent to -27 percent from Udall and Overpeck[81] and -14 percent to -31 percent from Milly and Dunne[82], which studies were even cited in the DEIS to predict lower flows in the Virgin River.

Also, the 2005 EIS did not analyze the lower flows predicted in the BOR's 2012 Colorado River Basin Water Supply and Demand Study (Basin Study), Technical Report B – Water Supply Assessment. It estimates possible future flow reductions by using the Global Climate Model (GCM) projections.

Information on the GCM from the Basin Study includes the following, from "8.0 Future Supply under the Downscaled GCM Projected Scenario, 8.1 Methods, page B-43:[83]

> *"Future changes in climate variability and trends, and their influence on streamflow and Basin water supply, have been studied by several researchers in recent years, and GCM future projections indicate that the climate may exhibit trends and variability over the next 50 years beyond what has occurred*

---

80. Utah State Legislature, Rep. Scott Chew introduced HCR 23 in the 2020 session, at: https://le.utah.gov/~2020/bills/hbillint/HCR023.pdf
81. Udall, B., and J. T. Overpeck. 2017: "The twenty-first century Colorado River hot drought and implications for the future." Water Resources. Res., 53, 2404–2418, at: https://doi.org/10.1002/2016WR019638; and
Mu. Xiao, Udall, Lettenmaier, "On the causes of declining Colorado Stream Flows", 2018 , at: https://agupubs.onlinelibrary.wiley.com/doi/abs/10.1029/2018WR023153.
82. Milly, P.C.D. and Dunne, K.A. 2020. "Colorado River flow dwindles as warming-driven loss of reflective snow energizes evaporation". Science 367 (6483), 1252-1255. DOI: 10.1126/science.aay9187, at: https://science.sciencemag.org/content/367/6483/1252.abstract
83. BOR, "Colorado River Basin Water Supply and Demand Study", Technical Report B- Water Supply Assessment, Table B-2, Dec 2012, page B-82, at: https://www.usbr.gov/lc/region/programs/crbstudy/finalreport/Technical percent20Report percent20B percent20- percent20Water percent20Supply percent20Assessment/TR-B_Water_Supply_Assessment_FINAL.pdf

historically. The Downscaled GCM Projected scenario is one representation of this plausible future condition."

"Table B-3 summarizes the annual and monthly statistics for the Downscaled GCM Projected scenario for three distinct future periods (2011 to 2040, 2041 to 2070, and 2066 to 2095) to assist in the evaluation of temporal trends. It should be noted that the last of these three periods is beyond the Study period but is shown to assist in the understanding trajectory of projected changes. Under this scenario, mean annual flows are expected to continue to decrease over time (from -7.5 percent around 2025 to -10.9 percent around 2055, to -12.4 percent around 2080) as compared to the 1906 to 2007 mean. At the same time, the shift in peak streamflow timing evolves from a current peak in June to an eventual peak in May due to earlier snowmelt and increased rain-to-snow ratios in response to warming."

TABLE B-3 Summary of Annual and Monthly Streamflow Statistics for the Downscaled GCM Projected Scenario for the 3 Future 30 Year Time Periods: 2011–2040 (2025), 2041–2070 (2055), and 2066–2095 (2080)".

	Statistic	*Downscaled GCM Projected 2011–2040 (2025)*	*Downscaled GCM Projected 2041–2070 (2055)*	*Downscaled GCM Projected 2066–2095 (2080)*
Annual water year	*Annual (Water Year) Average Annual Flow (maf)*	*13.9*	*13.4*	*13.1*
	percent Change from Long-Term Mean (1906–2007)	*-7.5 percent*	*-10.9 percent*	*-12.4 percent*
	Median (maf)	*13.8*	*13.3*	*13.4*

Coalition: As explained in our comments earlier, if there is only 13.4 MAFY as an annual flow at Lee Ferry, there is not enough water for the LPP for the duration of the 50-year BOR water exchange contract.

More importantly, according to a March 3, 2007 letter[84] from the BOR to the Utah Division of Water Rights about the proposed Aaron Million's pipeline, there was uncertainty on how much water is available for marketing in Flaming Gorge Reservoir. The current modeling to determine how much water can be sold in Flaming Gorge Reservoir only uses the 100-year historical average that doesn't account for climate change reducing the future flows.

Some excerpts from the BOR's letter:

84. BOR letter to Upper Basin River Commission, "Water Marketing From Flaming Gorge Reservoir", March 30, 2007 http://www.riversimulator.org/Resources/UCRC/UCRCflamingGorgeWaterAvailibilityReclamation2007.pdf.

> *"A certain degree of uncertainty always surrounds yield studies. This analysis used an unusually long and accurate historic record. The modeling was also at a relatively high level of detail. The water supply may be further reduced or impacted by the outcomes of the future National Environmental Policy Act and Endangered Species Act processes associated with this project, and all water supply numbers should be considered preliminary until that process is completed. As one would expect, there is a degree of uncertainty beyond the original 40-year term of the water service contract. The potential contract for this water would reflect this uncertainty and the need for reevaluation at the time of contract renewal."*
>
> *"Our total estimated amount of water available from Flaming Gorge for the next 40 years is relatively small at 165,000 acre--feet per year."*

From "Background" in the letter, page 3:

> *"Each state has the responsibility to assure that their cumulative use does not exceed their individual compact allocations. Historically each state has used the basin yield from a hydrologic determination to calculate their respective allocations."*
>
> *…"Water available for potential contracting is a mass balance of supply, reservoir storage, and demands (both upstream and downstream). Water supplies originate primarily in Wyoming, and future upstream uses in Wyoming are expected to reduce inflows and supply as development continues under compact allocation…..ROD flows and particularly the ROD baseflows make a significate demand on storage and dramatically reduce the potential amount of water available for marketing from the reservoir."*

Since the BOR is willing to sell the remaining water in Flaming Gorge Reservoir to Utah, a new study needs to be completed to protect the senior water right holders, as well as the upstream and downstream water uses.

Another example of why a new study is needed in the DEIS is that there is still no consensus on how federal-controlled Green River water will be managed between the State of Utah and BOR. This is illustrated in BOR's April 18, 2014 letter on Water Right No.49-258, Change Application No. a 38730. The BOR was concerned that the State of Utah couldn't allocate the water because they didn't have a BOR service contract to use the water coming out of Flaming Gorge Reservoir.

The Utah Division of Water Rights as late as 2014 argued that the State of Utah didn't need to buy federal water because it was still considered the state's water. The BOR details the purposes of the Flaming Gorge Reservoir in its letter of April 18, 2014.[85] BOR asked the Utah State Engineer for a reconsideration of its approval of this water right change application; however,

85. BOR letter to Utah Division of Water Rights, "Request for Reconsideration of the March 27,2014, Order of the State engineer for Change Application No. a 38730 (49-258)-Colorado River Storage Project", April 16, 2014, at: https://www.waterrights.utah.gov/docImport/0563/05632598.pdf.

the state approved the water right change application anyway.[86] This example shows there is still a disagreement on how federal waters will be managed between the State of Utah and BOR and that federal statutes control the use of water in Flaming Gorge Reservoir and flowing out from the dam and not Utah's water right No. 41-3479 for the LPP. Therefore, a study is needed to determine how much water remains for sale from Flaming Gorge Reservoir and who has the priority rights to use it over the long term.

The DEIS is not sufficient for the following reasons:

1. It looks at the LPP withdrawal as a standalone project and doesn't take into account the upstream and downstream impact of water withdrawals on senior water right holders.
2. It doesn't analyze that the water for the water exchange contract is coming from Flaming Gorge Reservoir, along with the constraints already extant on that system.
3. It lacks a Hydrological Determination for the BOR's 50-year water contract for the LPP that considers a drier future for the Colorado River.
4. It doesn't consider how, as flows decline, BOR will manage Flaming Gorge Reservoir to meet its obligations to the Lower Basin States in the 1958 Act of April 1956, 70 statutes, 43 U.S.C.§620.[87] These federal purposes will control the use of water stored in Flaming Gorge Reservoir and not Utah's Water Right No. 41-3479 for the LPP.
5. The Coalition outlined these same concerns in our Lake Powell Pipeline Coalition FERC comments, FERC, NREA Comments eLibrary accession no.20181120-5012 (November 20, 2018) pages, 18-26.[88] Also, in our BOR Lake Powell Pipeline Scoping Comments, pages 30-53. [89]

3. Affected Environment and Environmental Consequences, page, 35.

> *"This chapter presents an assessment of the effects of the No Action Alternative and the two action alternatives on the human and natural environment. The affected environment and environmental consequences are described for each resource. All 24 resources were fully evaluated, as presented in Appendix C, Supplemental Resource Reports; a discussion of cumulative effects is provided in Chapter 5 of this DEIS and in Appendix C-25, Cumulative Effects.*
>
> *"The only exception to the discussion of cumulative effects analysis is for Hydrology, where the cumulative effects analysis is contained within the resource's respective section in this DEIS and appendix due to the unique methodology in identifying and analyzing effects of past, present, and*

86. The Utah Division of Water rights, "Reissued Order of the State Engineer, Jan 06, 2015at: https://www.waterrights.utah.gov/docImport/0569/05693326.pdf.
87. U.S. Code Title 43. Public Lands, Chapter 12B, "Colorado River Storage Project, Section 620. Upper Colorado River Basin; purpose of development of water resources; initial units; construction of Wayne N. Aspinall unit contingent upon certification; participating projects; Rainbow Bridge National Monument", at: https://www.law.cornell.edu/uscode/text/43/620.
88. Comments Lake Powell Pipeline Coalition," NREA Comments eLibrary accession no.20181120-5012 (November 20, 2018) pages, 18-26., at: https://conserveswu.org/wp-content/uploads/FERC-comments-2018-FILED-.pdf.
89. BOR "Lake Powell Pipeline Coalition Scoping Comments, Jan 10, 2020, pages 30-53, at: https://conserveswu.org/wp-content/uploads/2020/01/LPP-Coalition-Scoping-Comments.pdf.

reasonably foreseeable future actions. The reader is encouraged to review Appendix C, Supplemental Resource Reports, in conjunction with this chapter. In addition, some of the supporting documentation for the supplemental resource reports includes the UBWR's final study reports from 2016, which can be found on Reclamation's website at https://www.usbr.gov/uc/envdocs/eis/LakePowellPipeline/index.html, along with updates to the 2016 study reports, which are separated by resource. The analysis in this chapter and in Appendix C, Supplemental Resource Reports, only relied on the UBWR's study reports insofar as they remained relevant at the time this DEIS was prepared."

Coalition: The affected environment for all these resources is very different if the hydrological modeling assumptions are wrong, which is much more likely because the modeling in the DEIS incorrectly assumes a low rate of future water use in the basin. A review by Lynker Technologies[90] (reproduced in this Appendix C, on page 7) finds that:

> "Elsewhere in Appendix C-10 and in the DEIS, Reclamation characterizes this modeling decision as providing "the maximum impact", but this is simply wrong. Each one of the seven Colorado River states plans to utilize fully all water that is physically and legally available to it. No justification is provided for this assumption of reduced basin-wide depletions, but even if one could be offered the assumption is scientifically incorrect and completely implausible and renders useless the hydrology results on which the DEIS is based."
>
> "Reclamation did include a "sensitivity analysis" wherein full basinwide projected demands were used to simulate the Project, but only against the historical inflow scenario. Using the full basinwide projected demands is the correct demand assumption, but that assumption main analysis. (The use of the direct natural flows to represent "historical" conditions overstates the performance of the Project, as is described more fully below.)"
>
> "In the DEIS and in Appendix C-10, it is not clear exactly what depletions from the Colorado River were simulated in modeling the No Action Alternative." See the specific language in comments Coalition Appendix C."[91]

3.1 Resources Considered but Eliminated from Further Study, page 36.

"Four of the 24 resources were considered but eliminated from further study in Chapter 3 based on the rationale in Table 3.1-1, below.

"Table 3.1-1 Resources Considered but Eliminated from Further Study

90. Ben Harding, Lynker Technologies, LLC, memo Review the DEIS to Conserve Southwest Utah, July 28, 2020. pages1-18, reproduced in Appendix C.
91. Ben Harding, Lynker Technologies, LLC, memo Review the DEIS to Conserve Southwest Utah, July 28, 2020. pages1-18, Appendix C.

> *"Primary concerns for general fish and wildlife regarding the Proposed Project involved construction activities affecting the migration and winter range of mule deer (Odocoileus hemionus) and crucial habitat of resident desert bighorn sheep (Ovis canadensis nelsoni). Due to construction restrictions for these areas during crucial times, these potential effects have been minimized to have negligible long-term effects on the populations."*

Coalition: The Coalition disagrees with the BOR's decision to drop any further analysis of the impact of building the LPP on the Kaibab-Paunsaugunt Wildlife Corridor because the construction is short term. The DEIS does not consider the large amount of permanent infrastructure that has to be built to support the LPP and its long-term impact on the migration corridor.

The DEIS is insufficient for the following reasons:

1. It failed to include this information on the Kaibab-Paunsaugunt Wildlife Corridor.
2. It failed to take into account the Bureau of Land Management's requirements to protect the Kaibab-Paunsaugunt Wildlife Corridor.
3. It didn't evaluate the environmental impacts of the proposed Lake Powell Pipeline on the biological connectivity value of the scientifically established significance of the Kaibab-Paunsaugunt Wildlife Corridor.
4. It failed to consider the Best Available Science Regarding Identification nor Protection of Wildlife Connectivity Requirements.

1. The DEIS failed to include information on the Kaibab-Paunsaugunt Wildlife Corridor.

Arizona's mule deer migrate off the high Kaibab Plateau (North Rim, Grand Canyon National Park; North Kaibab Ranger District, USFS) to winter range on either side of the mountain.[92] While researchers believe most of the winter range for the Kaibab herd is on the western side of the Plateau,[93] U.S. Highway 89 (U.S. 89) east of Kanab, Utah, bisects the seasonal migration of the Paunsaugunt mule deer (*Odocoileus hemionus*) herd. This large herd is composed of dozens to hundreds of smaller herds of deer that total thousands of animals. The herd overall, travels south toward Arizona in the winter, and north toward the Paunsaugunt area near Bryce Canyon National Park and Cedar Mountain in the summer.[94]

Paunsaugunt mule deer use the same migration corridors during autumn and spring when moving to or from winter range in the Buckskin Mountains.[95] Mule deer movements were likely restricted to limited breaks in the almost vertical White Cliff and separate the Skutumpah and Wygaret terraces; further, movements likely occurred through limited breaks in the precipitous

---

92 Haywood, D.D., R.L. Brown, R.H. Smith and C.Y. McCulloch. 1987. Migration Patterns and Habitat Utilization by Kaibab Mule Deer. Arizona Game and Fish Department Federal Aid in Wildlife Restoration Project W-78-R Report, Phoenix. 29 pages.
93 Carrel, William K., Richard A. Ockenfels, and Raymond E. Schweinsburg. 1999. An Evaluation of Annual Migration Patterns of the Paunsaugunt Mule Deer Herd Between Utah and Arizona. Arizona Game and Fish Department Technical Report 29. Phoenix. 44 pages.
94. Cramer, Patricia. 2016. US 89 Kanab-Paunsaugunt Wildlife Crossings and Existing Structures Research Project. 2016 Spring Report. https://wildlifeobserver.net/resources/us-89-wildlife-crossings-and-existing-structures-research-project-2016-spring-report.
95. Carrel, William K., Richard A. Ockenfels, and Raymond E. Schweinsburg. 1999. An Evaluation of Annual Migration Patterns of the Paunsaugunt Mule Deer Herd Between Utah and Arizona. Arizona Game and Fish Department Technical Report 29. Phoenix. 44 pages.

Vermilion Cliffs that separate Wygaret Terrance from the valley to the south. Main drainages through these cliffs provide the easiest access. Researchers believe Johnson Canyon and Deer Springs Wash are the primary routes through the White Cliffs for mule deer traveling to and from winter range.[96] Deer Springs Wash seemed the primary route thorough the Vermilion Cliffs.[97] For mule deer that migrated to and from Wygaret Terrace just north of Kanab, researcher suggest Kanab Creek is their route through the White Cliffs.[98]

2. The DEIS failed to take into account the Bureau of Land Management's requirements to protect the Kaibab-Paunsaugunt Wildlife Corridor.

The first goal of the President's National Fish, Wildlife, and Plants Climate Adaptation Strategy is to build or maintain ecologically connected network of terrestrial, coastal, and marine conservation areas that are likely to be resilient to climate change and support a broad range of fish, wildlife, and plants under changing conditions.[99] Major reviews of climate change conservation management options generally identify increased habitat conservation and establishing or restoring habitat connectivity as the top, if not the top, options to pursue.[100] Identifying such priority areas, in this case, the Kaibab-Paunsaugunt Wildlife Corridor, also benefits wildfire management, mitigation investments, restoration efforts, and water and air quality.

- BLM Authority to Designate Wildlife Corridors

The BLM has broad authority to administratively designate wildlife corridors (similar to the Centennial Mountains ACEC,[101] Trappers Point [Path of Pronghorn],[102] and Sonoran Desert designations,[103] for mitigation of existing and potential wildlife habitat fragmentation. Under the Federal Land Policy and Management Act (FLPMA), the BLM is charged with identifying, inventorying, and protecting important natural resources, such as wildlife corridors, on the public lands. FLPMA requires that the BLM identify and inventory the public lands for resources and important values, giving priority to designation of areas of critical environmental concern, and manage the lands pursuant to resource management plans (RMPs) that are based on this inventory.[104] FLPMA directs the BLM to manage the public lands in a manner "*that will* ***protect***

---

96. Carrel, William K., Richard A. Ockenfels, and Raymond E. Schweinsburg. 1999. An Evaluation of Annual Migration Patterns of the Paunsaugunt Mule Deer Herd Between Utah and Arizona. Arizona Game and Fish Department Technical Report 29. Phoenix. 44 pages.
97. Ibid.
98. Ibid.
99. Council on Climate Preparedness and Resilience [Council]. 2014. Priority Agenda: Enhancing the Climate Resilience of America's Natural Resources. http://www.whitehouse.gov/sites/default/files/docs/enhancing_climate_resilience_of_americas_natural_resources.pdf, Accessed 11-13-14.
100. Establishing or restoring habitat connectivity as the top, if not the top, options to pursue: Mawdsley, J. R., R. O'Malley, and D.S. Ojima. 2009. A Review of Climate Change Adaptation Strategies for Wildlife Management and Biodiversity Conservation. Conservation Biology 23(5):1080-1089. Available at: http://nctc.fws.gov/courses/climatechange/climateacademy/documents/Mawdsl_et_al_2009 percent20(2).pdf
101. Bureau of Land Management. 2006. Record of Decision and Approved Dillon Resource Management Plan. February 2006. http://www.blm.gov/style/medialib/blm/mt/field_offices/dillon/rmp/rod.Par.10875.File.dat/ApprovedPlan.pdf
102. Bureau of Land Management. 2008. Record of Decision and Approved Pinedale Resource Management Plan. http://www.blm.gov/style/medialib/blm/wy/programs/planning/rmps/pinedale/rod.Par.45058.File.dat/05_Record_of_Decision_and_Approved_Pinedale_RMP.pdf
103. Bureau of Land Management. 2012a [BLM]. Lower Sonoran and Sonoran National Monument Proposed Resource Management Plan and Final Environmental Statement. June 2012. https://www.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=21457. Accessed 04/11/2016.
104. 43 U.S.C. §§ 1711(a), 1712.

the quality of scientific, scenic, historical, ecological, environmental, air and atmospheric, water resource, and archaeological values."[105] Furthermore, the BLM is expected to preserve "*certain lands in their natural condition; that will provide food and habitat for fish and wildlife.*"[106]

3. The DEIS didn't evaluate environmental impacts of the proposed Lake Powell Pipeline on the biological connectivity value of the scientifically established significance of the Kaibab-Paunsaugunt Wildlife Corridor.

U.S. 89 bisects this historic and ecologically significant migration route. In 2013, Utah Department of Transportation (UDOT) and Utah Division of Wildlife Resources (UDWR) worked together with multiple partners to create the U.S. 89 Kanab-Paunsaugunt Project. The goal of the project was to funnel a portion the Paunsaugunt mule deer herd through the new wildlife crossing culverts and three existing culverts and bridge to help reduce the mule deer-vehicle collisions in this area.[107] Subsequent study results from 2016 reveal increasing mule deer numbers through the structures and throughout other portions of the year rather than just during migrations.[108] Other wildlife species benefit from these wildlife crossing installations. The proposed pipeline also bisects this migration route and, as noted in the DEIS, "pipeline trenching during construction may cause temporary barriers to sensitive species moving through an area that are unable to cross the trench during construction."[109] While the agency assures us this situation would be short term and localized within the ROWs,[110] they estimated that "final design would take approximately two years post-ROD and construction would begin after that and is anticipated to occur over a six-year period."[111] The DEIS also points out "*[v]arious components of the LPP may be constructed simultaneously throughout the Project Area during this period.*" Mule deer exhibit high fidelity to their migration routes and seasonal ranges.[112] Migration is learned,[113] and herd mammals, like mule deer, follow historic routes passed along by the mother to their young until it becomes instinctually ingrained in the animals.[114] *Prolonged disruption of movement across the proposed pipeline project area most likely will adversely affect the various herd's viability and must be evaluated in the FEIS.*

4. The DEIS failed to consider the Best Available Science Regarding Identification nor Protection of Wildlife Connectivity Requirements.

---

105. 43 U.S.C. § 1701(a)(8). (emphasis added).
106. 43 U.S.C. § 1701(a)(8).
107. Cramer, Patricia. 2016. US 89 Kanab-Paunsagunt Wildlife Crossings and Existing Structures Research Project. 2016 Spring Report. https://wildlifeobserver.net/resources/us-89-wildlife-crossings-and-existing-structures-research-project-2016-spring-report.
108. Ibid.
109. Bureau of Reclamation. 2020. Lake Powell Pipeline Project Draft Environmental Impact Statement. June 2020. https://www.usbr.gov/uc/DocLibrary/EnvironmentalImpactStatements/LakePowellPipeline/docs/20200600-LakePowellPipelineProject-DraftEIS-508-PAO.pdf.
110. Ibid.
111. Ibid.
112. Kauffman, Matthew J., James E. Meachham, Hall Sawyer, Alethea Y. Steingisser, William J. Rudd, and Emilene Ostlind. 2018. Wild Migrations: Atlas of Wyoming's Ungulates. Corvalis: Oregon State University Press. 181 pages.
113. Ibid.
114. New Tracking Technology Reveals Hidden Animal Migration Routes, Kristen A. Schmitt, January 8, 2019, Smithsonian Magazine, https://www.smithsonianmag.com/science-nature/technology-gps-collar-reveals-hidden-animal-migration-routes-180971185/: "It takes generations and generations for herds to learn migration corridors," According to Matthew Kauffman, professor of zoology and physiology at the University of Wyoming and director of the Wyoming Migration Initiative. "If you wipe out a herd that has knowledge of a specific migration, then you lose all the knowledge that those animals have of how to make that migration."

- Best Available Science

The Department of Interior (DOI) was clearly committed to implementing a policy of using the best available scientific information (BASI) for planning documentation, a principle foundation for establishing wildlife corridors. The DOI Policy for the Integrity of Scientific and Scholarly Activities posits as its central tenet at §3.4 Policy "The Department… will not tolerate loss of integrity in the performance of scientific and scholarly activities or in the application of science and scholarship indecision making…" This policy further requires that scientific findings and conclusions be made subject to public vetting: *§ 3.4.C "Document the scientific and scholarly findings considered in decision making and ensure public access to that information and supporting data through established Departmental and Bureau procedures…."* In another DOI example of applying the BASI—the National Landscape and Conservation System (NLCS) was legislatively established by the Omnibus Public Land Management Act of 2009[115] *in order to conserve, protect, and restore nationally significant landscapes that have outstanding cultural, ecological, and scientific values for the benefit of current and future generations*. The BLM policy manual describes how "*the BLM will use the best available science in managing the NLCS"* and how *"science and the scientific process will inform and guide management decisions concerning NLCS units*."[116] Providing a scientific foundation for decision-making is also a goal identified in the NLCS 15-Year Strategy (Goal 1C).

3.7 Recreation, page 99.

Coalition: Federal lands are owned by all Americans, and the DEIS should look beyond economics to protect public lands for future generations. The DEIS (page 99) is not sufficient because it only considers impacts within one mile of the pipeline, which is insufficient as it omits completely the effect of the necessary infrastructure that has to be built to support the pipeline.

The proposed new permanent structures include six hydroelectric plants 25 feet high, each with a substation and five pump stations 35 feet high, each with a substation with power lines, high steel power poles connecting them to existing power grids, cell towers, parking lots, two substations along the power lines, lights, newly paved access roads, regulating tanks and reservoirs, manholes, air release valves, vacuum relief valves, blow-off valves, fencing, buried forebay tanks, buried surge tanks, and surface overflow detention basins all of which require weekly maintenance and increased traffic. The operation, maintenance, repair, and excavation of the pipeline would significantly degrade the region's scenic beauty, its wildlife, and its wildland remoteness.

3.8 Hydrology, 3.8.1 Affected Environment, 3.8.1.1 Regulatory Framework and Methodology, page 113.

> *"Through coordination with the state, Reclamation conducted several hydrologic modeling runs using Reclamation's long-term planning model, the Colorado River Simulation System (CRSS). The CRSS modeling tool was used to assess the effects of the LPP alternatives on water resources and to provide relevant information for other models used to assess other resources. Hydrologic modeling provides projections of potential future Colorado River system conditions (e.g., reservoir elevations, reservoir releases, river flows) under the No Action Alternative for comparison with conditions under the*

115. Public Law 111-11.
116. BLM Manual §6100(1.6)(A)(9) and (1.6)(F)(1)).

Southern and Highway Alternatives. This section presents the results of two hydrologic modeling runs: one for the No Action Alternative and one that represents either the Southern or Highway Alternative. This is due to the fact that there is no difference between the Southern and Highway Alternatives in how or when water would be diverted from Lake Powell. Due to uncertainties associated with future inflows into the Colorado River system, multiple simulations were performed for each alternative to quantify the uncertainties in future conditions, and the modeling results are typically expressed in probabilistic terms. Further details regarding the CRSS and its standard assumptions are available in the modeling appendix of the 2007 Interim Guidelines Environmental Impact Statement (EIS) (Appendix A of Reclamation 2007). Appendix C-10, Hydrology, provides a brief background on CRSS, all relevant modeling assumptions used in the CRSS, and a description of any changes made to the CRSS, specifically for the Proposed Project modeling.

"The results of these model runs were used to determine potential effects on the hydrology of the Colorado River system from development of the UBWR's water right. These depletions and diversions were covered in the 2005 Operation of Flaming Gorge Dam Final EIS and are being analyzed for the purpose of signing Contract No. 17-WC-40-656 for Exchange of Water-Lake Powell Pipeline between the United States of America and the State of Utah. The LPP water exchange contract was designed to be in compliance with the Flaming Gorge Record of Decision. In other words, executing the water exchange contract would not change operations at Flaming Gorge Dam. General Model Assumptions The following general assumptions were made for CRSS; Table 3.8-1 shows modeling assumptions by alternative: • January 2020 initial conditions for all modeled reservoirs; • Powell 3,608.24 feet; • Run duration: 2020 to 2060; • Runs revert to the Interim Guidelines No Action Alternative in 2027; • Drought Contingency Plan (DCP) Operational Parameters revert in 2027; • Index Sequential Method used for the direct natural flow (DNF) period of record (1906 to 2018): 113 simulations; and • Climate change inflows: 112 simulations."

Coalition: CSU contracted with Lynker Technologies LLC, an engineering firm, to help understand the details involved in the relevant hydrology modeling concerning the assumptions and conclusions in the DEIS. They determined the DEIS was deficient for these reasons:[117]

1. The sensitivity analysis only used the 100-year historical flow of 15 MAFY at Lee Ferry and does not analyses future climate change impacts to water availability for the LPP over the 50-year term of the water exchange contract;
2. Some of modeling used includes rare events that happened 1200 years ago during a wet period, which over states the reliability of the LPP;
3. It fails to use some of the best science on climate modeling from a large body of results from the BOR's studies such as the BOR's "The Colorado River Basin Water Supply and Demand

117. Ben Harding, Lynker Technologies, LLC, memo Review the DEIS to Conserve Southwest Utah, July 28, 2020. pages1-18, reproduced in Appendix C.

Study", Technical Report B- Water Supply Assessment, Table B-3, Dec 2012, page B-82, at: https://www.usbr.gov/lc/region/programs/crbstudy/finalreport/Technical%20Report%20B%20-%20Water%20Supply%20Assessment/TR-B_Water_Supply_Assessment_FINAL.pdf;

4. The hydrology analyses on which the DEIS is based and Reclamation's 2012 Basin Supply and Demand Study have methodological shortcomings that result in an overstatement of the performance of the Project and understatement of its impact;
5. It lacked an analysis of how the Interim Guidelines may affect the withdrawal of water for the LPP from Lake Powell as water levels decline in Lake Powell;
6. It failed to do an analysis of the Drought Contingency Plan and the possible effect on withdrawing water from Lake Powell for the Lake Powell Pipeline;
7. The conclusions of the modeling were flawed because it kept depletions to 2020 levels, which is an unreasonable conclusion that the other Basin States would not divert their allocations;
8. The modeling didn't consider water required for Mexico;
9. Its hydrology analyses are not based on sound science or sound assumptions;
10. It does not provide a direct assessment of the reliability of the project;
11. It doesn't consider lower flows in the Colorado River predicted by flow changes at 2050 ranged from -7% to -27% for Udall and Overpeck and -14% to -31% for Milly and Dunne; and
12. It has Methodological shortcoming in the 2012 Supply and Demand Study.

3.9 Water Quality, 3.9.1 Affected Environment, page 122 et seq., 3.9.2 Environmental Consequences, p. 131-133.

> *"This section describes the affected environment and effects analysis for water quality. Additional information is provided in Appendix C-11, Water Quality."*

Coalition: In the hydrology section (Section 3.8), the DEIS states that the Lake Powell Pipeline will not significantly alter lake volume:

> *"This contribution (to reduced storage values in Lake Powell) is within the variability affected by hydrology and is insignificant compared against both hydrologic variability and reasonably foreseeable projects."* (p. 118)

Despite this statement, the DEIS cites potential environmental impacts tied to volume and water withdrawals from Lake Powell in the water quality section (p. 131).

The water quality section of the DEIS lays out the potential environmental impacts of the proposed pipeline on streams, bodies of water (Lake Powell and Sand Hollow Reservoir), and groundwater. Potential impacts are linked to pipeline construction, changes in drainage, and pipeline maintenance activities. Though the DEIS recognizes volume changes as a potential environmental impact, little attention has been brought to the gravity of this effect and the implications for the Colorado River and Grand Canyon. Initial impacts linked to development are

highlighted more thoroughly, while nuanced long-term effects are left largely undiscussed in the DEIS.

Temperature:

Water temperature has a cascading effect on environment conditions and biodiversity. Lower lake levels associated with water diversion will lead to higher water temperatures in Lake Powell. This change will cause warmer water to flow from Lake Powell to the Lower Colorado River, which could lead to shifts in the biodiversity of the Colorado River and Grand Canyon. Warmer temperatures could benefit nonnative species (smallmouth bass, brown trout, green sunfish, and walleye), which could further imperil endangered humpback chub populations in the Grand Canyon. Preventing native organisms from thriving could dissolve important ecological links between all manner of organisms.[118]

The United States Geological Survey (USGS) points to reference conditions at Lake Powell as driving environmental conditions downstream:

> *"The future of CRe (the Colorado River ecosystem) will likely be determined by the quality of the water (temperature and nutrients) exiting Lake Powell."*

Preliminary data from Kimberly Dibble and USGS point to evidence that Lake Powell water storage decisions strongly influence downstream river temperatures.[119] Air temperature will also drive increases in water temperature, but not to the same degree as Lake Powell water storage. The potential impacts associated with projected warming in the Colorado River ecosystem include benefits like more spawning areas, higher growth of native fish, and increases in invertebrate taxa, although parallel negative impacts could largely negate these positive impacts. Hypothetically, humpback chub could benefit from warming waters, but limits to nutrient availability and dangers associated with nonnative fish make it evident that humpback chub actually face increasing challenges. Negative impacts associated with warmer temperatures include nutrient declines and potential expansions of nonnative fish that could deteriorate native fish populations. Ultimately, there is still much uncertainty around the Colorado River ecosystem response to warmer water temperatures but there are clues that this is a topic to diligently investigate looking forward.

Chemistry:

The intake structures at Lake Powell are now in the metalimnion, which is a vertical zone of rapid changes in temperature and chemistry with depth. This means that changes in lake level can cause drastic changes in output, though these changes have not yet been thoroughly quantified. There is no concrete evidence currently that dissolved nutrients, water oxygen, or phosphorus levels will vary significantly with the changing water levels, although there is preliminary data pointing to changes in nutrient levels tied to changes in temperature. These data provide evidence that warmer water contains less available nutrients based on observations that ongoing warming and limited nutrient availability in the Colorado River ecosystem has lowered survival and growth of humpback chub and impacted spawning.

---

118. Glen Canyon Dam Adaptive Management Program (GCDAMP), "Water Temperature below Glen Canyon Dam", at: http://gcdamp.com/index.php?title=TEMPERATURE.
119. Dibble, K., "Potential implications of a warmer future for the Colorado River ecosystem", USGS Annual Reporting Meeting, Phoenix, Arizona, January 13, 2020, at: https://www.usbr.gov/uc/progact/amp/twg/2020-01-13-twg-meeting/20200113-AnnualReportingMeeting-PotentialImplicationsWarmerFutureColoradoRiverEcosystem-508-UCRO.pdf.

Recommendation: There is mounting evidence suggesting the importance of lake volume, water temperature, and nutrient levels for maintaining biodiversity within the Colorado River ecosystem. The Bureau of Reclamation should more thoroughly discuss potential changes in lake volume, temperature, and associated impacts to nutrient availability in the DEIS. The Bureau should also commit to supporting research to investigate the direct and indirect impacts of changing water levels in Lake Powell and resulting water temperatures.

3.10 Aquatic Invasive Species, 3.10.1 Affected Environment, page 135 et seq.

> *"The control and active monitoring of aquatic invasive species (AIS) that could be conveyed by the LPP from Lake Powell to other drainages in Utah and Arizona must be carefully monitored, controlled, and carefully managed. While there can be any number of plant and animal species that may be considered invasive and potentially of concern, the well-publicized organism and primary concern for the Proposed Project is the quagga mussel (Dreissena rostriformis bugensis). Quagga mussels have significant operational and environmental impacts in the lower Colorado River drainage and continue to be a serious problem. The quagga mussel is a fresh-water invasive mollusk native to the Dnieper River drainage in the Ukraine. It was introduced to North America via ships' ballast water discharge while sailing through the Great Lakes and has spread invasively throughout the country, primarily by recreational boaters. The elaborate array of water conveyance systems throughout the west creates a means of introduction to areas free of infestation. As quagga mussels continue to spread, water conveyance systems are impacted by biofouling while ecosystems are degraded."*

Coalition: The DEIS lacks the information that controlling quagga mussels has not been successful; the LPP thus puts Washington County's water resources at risk. Although many cost concerns have been raised in this document, the potentially substantial cost of controlling quagga mussels lacks any analysis. As early as 1998, the U.S. Fish and Wildlife Service created the 100th Meridian Initiative to slow the westward spread of this and other invasive species. It was clear even then that the mussels can severely compromise efficiency at water facilities by causing flow restrictions and encouraging rust on infrastructure and damaging the environment. The first quagga mussel west of the Continental Divide was discovered Jan. 6, 2007. Lake Powell is already infested with the quagga mussels.

3.13 Special Status Plants, page 153.

Coalition: Of high concern is the fact that there are several newly identified rare plants in Utah that haven't been widely known, and an additional species that is ESA-listed (all of which also occur in AZ but considered rare there) that now have all been confirmed near the UT-AZ border that have been given no consideration and that the Utah BLM has not yet even considered in terms of sensitive species protection. The pipeline may go through the habitat of several of these species. Those species are:

- *Pediocactus peeblesianus* (ESA listed as var. *fickeiseniae*, but there are forma taxonomic problems with that name that have not been rectified and treated by some)

- *Pediocactus peeblesianus* subspecies *fickeiseniorum*, in the Hurricane Cliffs area, is ESA-listed
- *Mentzelia memorabilis*
- *Phacelia hughesii*
- *Tetradymia canescens* var. *thorneae*
- *Eriogonum mortonianu*m (NatureServe G1)
- *Eriogonum thompsoniae* var. *atwoodii* (NatureServe G4T1)
- *Cryptantha semiglabra*

3.15 Threatened and Endangered Species, page 177.

Coalition: Areas of Mojave desert tortoise habitat would be affected by building the LPP. BOR's plan to mitigate impacts to Mojave desert tortoises is insufficient to meet the need of protecting these threatened animals. Habitat for the threatened Mojave desert tortoise is already under stress due to development pressures; LPP construction activities would add additional stress.

3.16 Visual Resources, page 196.

Coalition: The Coalition has detailed in these comments that there are less damaging alternatives to getting water for growth. However, the proponents continue to ignore alternatives and pursue the LPP. It isn't in the public's interest to destroy this pristine landscape without considering that the Colorado River is not a viable solution. LPP construction adds to the industrialization of US 89, which is a scenic corridor in the Grand Staircase Escalante National Monument (GSENM). The GSENM boundary was illegally reduced by the Trump administration to allow fewer restrictions to building the LPP. The scenic beauty of our public lands in Washington and Kane counties is world-renowned and drives our economies, providing thousands of jobs in hospitality and tourism. Visitors driving to different National Parks and the Grand Staircase Escalante National Monument would be adversely affected by the visible scars from building the LPP and the infrastructure to support it.

The DEIS is deficient because:

- LPP infrastructure would scar the scenic beauty of desert landscapes, disturb wildlife, and expose and damage archeological and cultural sites along its route.
- Scars from the LPP would harm scenic beauty important to Utah's economy, which is transitioning to tourism and outdoor recreation. This industry provides 110,000 direct jobs and $3.9 billion in wages in the state of Utah in 2017.[120]
- LPP facilities would be visible from US Highway 89 and other highways along with vast, scenic areas, compromising viewscapes for untold thousands of visitors, and affecting tourism.

120. Utah Outdoor Industry Association, at: https://outdoorindustry.org/wp-content/uploads/2017/07/OIA_RecEcoState_UT.pdf.

- The BOR failed to consider the value of pristine land lost and scarred for future generations.
- The BOR must assess the economic effects of lost scenic values on tourism and major events in the region.
- These lands draw American and international tourists from around the country and provide valued outdoor recreation opportunities and would be permanently scarred by LPP's infrastructure and all the other infrastructure to support it.[121]

3.17 Cultural Resources, page 214.

DEIS Released at Culturally Insensitive Time for the Tribes

This DEIS, which has been in the works for more than a decade, could not possibly have been released for public review at a more difficult time for affected Tribes. The struggles of Arizona Tribal Nations during COVID-19 have made national news, in particular the Navajo Nation which has seen a terrible loss of life.

Tribes have borne the brunt of disproportionate impacts from the novel coronavirus, due to a lack of water infrastructure, polluted water supplies, and legacy health conditions, among other reasons.[122] The Navajo Nation shut down offices and imposed curfews on residents; other regional Tribes such as the Hopi and Havasupai Tribes also closed areas to outside visitation. The Cocopah Tribe lost its Vice Chairman to COVID-19, and the disease took the lives of former government officials of the Hopi and Ak-Chin Tribes.[123] Most of the region's Tribal governments have been consumed with trying to deliver supplies to Tribal members and managing healthcare and financial needs. During this time, the Tribe most affected by the LPP Proposed Action, the Southern Paiute Consortium, mourned the loss of its Cultural Resources Director, Mr. Charley Bulletts, who has been a strong voice for protecting the Tribes' interests for many years.

It is unfair, disrespectful, and pitiless that this important decision must be made now, when so much mourning is occurring, and Tribal government resources are stretched so thin. The Tribes cannot give adequate time and attention to this proposal at this time. And it is quite ironic that the purpose of this pipeline is to supply yet more water to a city that uses more than twice as much water as the average American, while the region's Tribes struggle with inadequate water infrastructure and legacy contamination issues that challenge their ability to provide for their domestic and livestock needs, and impacts many tribal members' ability to simply wash their hands properly during a pandemic.[124] By releasing the EIS at this moment in time, BOR accentuates the juxtaposition of privilege and lack that this project exemplifies. The

---

121. State of Utah's Travel and Tourism Industry, 2019, at: https://travel.utah.gov/wp-content/uploads/2019-TTtrifold-Updated.pdf.
122 Baek, G., "Navajo Nation residents face coronavirus without running water", CBS News May 8, 2020, 8:07 PM, at: https://www.cbsnews.com/news/coronavirus-navajo-nation-running-water-cbsn-originals/.
123 Minkler, A. "Cocopah Tribe mourns tribal Vice Chairman J. Deal Begay Jr.", Arizona Republic, published 7:25 p.m. MT June 25, 2020, at: https://www.azcentral.com/story/news/local/arizona/2020/06/25/cocopah-indian-tribe-leader-j-deal-begay-jr-dies-covid-19/3251362001/.
124 Totten, K. "St. George Water Usage Far Exceeds National Averages", KNPR May 31, 2018, at: https://knpr.org/knpr/2018-05/st-george-water-usage-far-exceeds-national-averages.

Environmental Justice discrepancy between those proposing the LPP and those being told to make sacrifices so it can be built is stark and shameful.

3.19 Indian Trust Assets, page 233.

> *"Indian Trust Assets (ITAs) are legal interests in property held in trust by the United States for federally recognized Indian tribes or individual Indians (e.g., Reclamation 2009: Section 4.19-1 and Reclamation 2017: Section 19). ITAs may include land, minerals, federally reserved hunting and fishing rights, federally reserved water rights and claims, and instream flows associated with trust land. Beneficiaries of the Indian trust relationship are federally recognized Indian tribes with trust land; the United States is the trustee. By definition, ITAs cannot be sold, leased, or otherwise encumbered without approval of the United States."*

Coalition: The DEIS is not sufficient because it does not consider or disclose that the Indian Tribes have senior water rights in the Green and Colorado River Basins and they still have undeveloped water rights that would be senior over the state's water rights. The Northern Ute Tribe was supposed to receive water from the Ute Unit of CUP that was never built. But the BOR assigned those water rights in 1995 to the State of Utah instead. The Northern Utes have also asked for a service contract out of Flaming Gorge Reservoir, but that has not been approved. Therefore, as physical water flows decline, the DEIS should analyze how the BOR would protect Indian Trust water rights, including those of the Northern Ute Tribe. BOR should determine how much water would remain in Flaming Gorge Reservoir that can be relied on for 50-year water service contract before BOR sells water to the proponents.

The DEIS fails to provide evidence that, after the LPP is in use, adequate water will be available to the Lower Basin in compliance with the Colorado River Compact. The BOR cannot ignore that the Northern Ute Tribe has senior water rights over the LPP, unlike the states. BOR has had a critical role in protecting Native American water rights in the Colorado River. These rights are senior to any Utah water right, and BOR must protect them but, by approving the LPP, they would be undermining these Tribal water rights. This analysis is missing from the DEIS.

Resolving Indian water rights and the other Federal Reserved Water Rights would remove significant uncertainty to how much water would be available in Utah's remaining share of the Colorado River. Federal Reserved Water Rights in the Colorado River have to come out of Utah's remaining share of its Colorado River Compact rights, which is about 361,000 AFY. The proponents and BOR are using an outdated higher amount of water of 15 MAFY as the "natural flow" and not the lower amount of 12-13 MAFY which is more realistic. Colorado River flows are declining, and Utah is only entitled to 23 percent of what remains after earlier priority water rights are met. The DEIS needs to analyze how BOR will meet its obligations of the CRSP and to other senior water rights holders and the Indian Tribes before selling project water to the proponents.

Further, the DEIS did not address any of the tribal concerns from the scoping comments. See Appendix B, referenced in the DEIS as:

> *"3.4.19 Native American Concerns, page 11*

"Eight comments addressed Native American concerns. Some of the commenters expressed their concerns with water supply and the water rights of tribes in the region. By transporting water away from the area, the stakeholders are concerned with the availability of water for those tribal communities."

3.21 Environmental Justice, page 248.

LPP Should Not Proceed Because of Irreparable Damage to Tribal Interests
Also, 1.3 Agency Decisions, 1.3.1 Bureau of Indian Affairs, page 9:

"The pipeline route for the Highway Alternative would cross lands held by the United States in trust for the benefit of the Kaibab Band of Paiute Indians (Tribe)the KIR along Arizona State Route 389. The Tribe would need to consent to the ROW grant (and could impose conditions on its consent) and UBWR would be required to pay compensation to the Tribe."

3.17 Cultural Resources, 3.17.1 Affected Environment, page 214.

"In most cases, cultural resources that are located along the Project Area are finite, unique, fragile, and nonrenewable."

Coalition: The Southern Paiute Consortium as a whole, and the Kaibab Band of Paiutes Tribe in particular, is being forced into a difficult position: to sacrifice more than 200 cultural sites and surrender a portion of their historical homelands for building of the LPP. The pipeline offers no benefit to them, so in either case the Tribe would be making a difficult sacrifice that would impact their way of life for the benefit of a privileged class: St. George residents who can also choose to opt for water conservation rather than this pipeline. Meanwhile the Tribes continue to struggle with limited water access and infrastructure, and the pipeline that they are being forced to accommodate includes no plan to deliver water to Tribes.

This Entire Project Is Unjust and Unequitable to Environmental Justice Populations
Executive Order 12898, Section 1-1, 1-101 (1994) mandates (bold emphasis added):

"1–101. Agency Responsibilities. To the greatest extent practicable and permitted by law, and consistent with the principles set forth in the report on the National Performance Review, each Federal agency shall make achieving environmental justice part of its mission by identifying ***and addressing****, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations in the United States and its territories and possessions, the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of the Mariana Islands."* [emphasis added]

3.21. Environmental Justice, 3.21.1.1 Regulatory Framework and Methodology, page 248.

> *"E.O. 12898 does not dictate how federal agencies should respond to potential effects on minority and low-income populations, only that those effects be disclosed."*

Coalition: The DEIS misinterprets this Executive Order, while supplemental documents interpret it correctly. It is unclear why the DEIS should differ significantly from the Supplemental Documents; the DEIS must be substantially altered to make it consistent with the law. It is true that E.O. 12898 "does not dictate how agencies should respond", but it is *not* true that the order merely requires effects be "disclosed." It requires that agencies be "addressing… disproportionately high and adverse human health or environmental effects." Although E.O. 12898 is misrepresented in the DEIS, it is correctly interpreted in Supplement Number 3 Environmental Justice:

Supplement Number 3 Environmental Justice, page 4

> *"Federal agencies are directed by Executive Order 12898 to detect **and mitigate** potentially disproportionately high and adverse human health or environmental effects…"* (emphasis added)

Coalition: This essential wording must be corrected in the DEIS at page 248 to reflect the requirement in E.O. 12898 that agencies address environmental justice impacts, not just disclose them. Further, **the DEIS must be updated to identify the proposed mitigations for every action with "disproportionately high and adverse human health or environmental effects" on environmental justice populations.** This will require substantial rewriting of the DEIS and redesigning the project, and another DEIS should be released if the project is to move forward.

The LPP will have "disproportionately high and adverse human health or environmental effects" along the entire pipeline route and those effects will extend beyond the route to impact American Indian Environmental Justice populations.

According to Table 3.21-1 (DEIS at page 252), **100% of the Project Area will affect either Low Income, Minority, or American Indian Environmental Justice populations** (as defined in Section 3.21.1.3, Existing Conditions, pages 252-253). In some parts of the Project Area, populations within all three Environmental Justice population categories are present.

Supplement Number 3 Environmental Justice, page 4.

> *"Together these maps illustrate the major loss of aboriginal territory experienced by the Southern Paiute people. Losses are measured from about 80,000 aboriginal square miles down to 898 square miles or about .011% remaining under control by Paiute people today. This fact and its implications for health, economy, social organization, religion, and spirituality are a foundation for considering further Environmental Justice effects from LPP land disturbances. This is also the foundation for understanding Paiute cumulative impacts."* [emphasis added]

Coalition: According to BOR's own supplemental documents, this is the **foundation** beyond which all impacts to the Southern Paiute Consortium must be measured as cumulative effects of

the Proposed Action. Because of the history of land removal and legacy of detrimental impacts to health, economy, social organization, religion, and spirituality, if BOR cannot mitigate "(1) holy land violations, (2) potential health effects, and (3) access to cultural places", this project should not proceed.[125] Other projects which would have caused impacts analogous to LPP on the Southern Paiute Consortium have been halted. LPP should be halted for the same reason as these projects:

> *"The Southern Paiute Salt Song Trail to the Afterlife also exists in physical and spiritual dimensions. It was determined by the California Energy Commission that a large proposed solar facility potentially could disrupt the flow of deceased spirits along this trail preventing them from reaching the afterlife (Arnold 2013; California Energy Commission 2012). A similar impact assessment was made for radioactive waste potentially spilled on the Salt Song Trail (Stoffle and Arnold 2003; Stoffle, Arnold, Bulletts 2015). The proposed LPP crossed this trail to the afterlife.*[126]

The DEIS and supporting documents for LPP clearly identify several environmental justice problems that will be exacerbated if LPP is built. The only way to avoid irreversible harmful impacts to minority and low-income populations is to ***not build the pipeline***.

3.21.2.1 No Action Alternative, pages 253-254:

> *"The No Action Alternative would have no effect on EJ populations. If the LPP were not built, the Proposed Project would have no additional negative effects on EJ populations."*

3.21.2.2 Southern Alternative

> ***"The Proposed Project would disproportionately affect the low-income and American Indian EJ populations.*** *The American Indian EJ population would be adversely affected due to construction activities for the Proposed Project, which would cause* ***permanent damage to locations that are culturally significant to local tribal groups, visual effects, and social effects on the tribes. Low-income households would be disproportionately affected*** *by expected increases in water rates and by other economic variables that are influenced by the price of water (see Appendix C-23, Socioeconomics)…*
>
> *"The Tribe has indicated that the Southern Alternative would damage culturally significant natural landscape features and would harm the Tribe's well-being (Appendix D, Analysis and Perspective of the Tribe, Supplement #3). The adverse effects of these specific physical damages to these landscape features would be unique to the Tribe and would not be shared by the wider population.* ***Disproportionate adverse effects on the Tribe are, therefore, anticipated to occur under this alternative.*** *Additional concerns from the*

125. Supplement Number 3 Environmental Justice at p. 4.
126. Supplement Number 3 Environmental Justice at p. 6.

Tribal perspective are provided in Appendix C-21, Ethnographic Resources, and Appendix D, Analysis and Perspective of the Tribes." [emphasis added]

3.21.2.3 Highway Alternative

"The Proposed Project would disproportionately affect the low-income and American Indian EJ populations. *Similar to the Southern Alternative, the American Indian EJ population would be adversely affected due to construction activities for the Proposed Project, which would cause* ***permanent damage to locations that are culturally significant to local tribal groups, visual effects, and social effects on the tribes, and disproportionate adverse effects on low-income households are anticipated*** *due to expected increases in water rates…*

"…The adverse effects of these specific physical damages to these landscape features would be unique to the Tribe and would not be shared by the wider population. ***Disproportionate adverse effects on the Tribe are, therefore, anticipated to occur under this alternative.*** *Additional concerns from the Tribal perspective can be found in Appendix C-21, Ethnographic Resources and Appendix D, Analysis and Perspective of the Tribe.*

"Under the repayment plan for the Proposed Project described in Section 3.20, Socioeconomics, and Appendix C-23, Socioeconomics, low-income populations living within the area to be served by the Proposed Project are expected to pay a higher percentage of their disposable incomes for water delivery, for property impact fees (whether directly or indirectly), and for local goods and services that incorporate higher water costs into their price structures in comparison to the broader community. Because demand for basic culinary water service is relatively price inelastic—meaning that the baseline amount of water consumed per person in a typical household is relatively inflexible regardless of the price charged per unit consumed—it is expected that ***lower income homes would experience disproportionate adverse economic effects*** *from implementation of the proposed action. See the socioeconomic resources referenced above for additional information.*

"No mitigation measures related to EJ are proposed for this project."

Coalition: The DEIS violates E.O. 12898 because it fails to address environmental justice issues. Not only will the construction and existence of the actual pipeline and facilities cause permanent disproportionate adverse effects to the tribes, the delivery of water via the pipeline will cause disproportionate adverse economic effects to low income populations. The impacts to American Indian Environmental Justice populations must be considered cumulatively with the legacy of previous and ongoing harms to health, economy, social organization, religion, and spirituality imposed on them. For low income populations, it is inhumane to raise the price of life-giving water for the poorest among us.

BOR has a Responsibility to Protect Cultural Resources, Executive Order (E.O.) 11593 – Protection and Enhancement of the Cultural Environment, **(54 USC 300101(Note)) states that:**

> *"Agencies of the executive branch of the Government (hereinafter referred to as 'Federal agencies') shall (1) administer the cultural properties under their control in a spirit of stewardship and trusteeship for future generations, (2) initiate measures necessary to direct their policies, plans and programs in such a way that federally owned sites, structures, and objects of historical, architectural or archaeological significance are preserved, restored and maintained for the inspiration and benefit of the people."*

The American Indian Religious Freedom Act of 1978[127] states that:

> *"It shall be the policy of the United States to protect and preserve for American Indians their inherent right of freedom to believe, express, and exercise the traditional religions of the American Indian, Eskimo, Aleut, and Native Hawaiians, including but not limited to access to sites, use and possession of sacred objects, and the freedom to worship through ceremonials and traditional rites."*

Coalition: Constructing LPP is in direct violation of the federal responsibility to adhere to the legal obligations of E.O. 11593 and The American Indian Religious Freedom Act of 1978. Agencies have a responsibility to preserve the resources within the Traditional Cultural Properties and Traditional Cultural Districts along the proposed LPP alignments. E.O. 11593 is explicit in its wording that "sites, structures, and objects" are "preserved," not moved or destroyed. Documentation is not preservation. The Southern Paiute Consortium, along with the Hopi Tribe and Zuni Tribe have made it clear that this project would infringe upon their ability to express and exercise their traditional religions, access sites, and worship through ceremonies and traditional rites.

It is unfortunate that much of the cultural knowledge shared here had to be made public. Hundreds of pages of cultural interpretation are provided as supplemental documents to this DEIS, no doubt a great emotional and time commitment for the tribal members who shared their information. It is the responsibility of the federal agencies who now possess this knowledge to protect the resources that they have been made aware of.

3.20.1.1 Regulatory Framework and Methodology.

> *"This analysis was conducted based on the financing and cost recovery provisions of Chapter 28, Part 4 of the Lake Powell Pipeline Development Act (UCA 73-28-101). Details of financing and cost recovery are subject to the contracts that would be developed under that Act.*
>
> *"An economic analysis was conducted, with benefits and costs considered regardless of whether they accrue to those inside or outside the four counties. Interest during construction was added to construction costs to represent the full economic cost of the Proposed Project. A financial analysis evaluated cash*

127. Public Law 95-341, 42 USC 1996, (Section 1) (p. 37 of Appendix C-20).

flows and affordability from the perspective of individual businesses, households, and agencies. A regional impact analysis evaluated both short- and long-term effects from construction and operations, within the four-county area."

Coalition: There is no analysis in the DEIS of financing or the costs to residents. The Utah Legislative Water Development Commission is developing new legislation to clear up questions about the uncertainty of how the LPP will be funded by the 2006 Act. The public has asked repeatedly how taxpayers and ratepayers will be affected, but the DEIS is silent on this important issue. It is not sufficient that the proponents assert that the state will pay for the LPP because the Act clearly requires the Washington County public to reimburse the state for LPP costs. The DEIS assumes without evidence that there is a benefit transfer; however, that is a false assumption as we detail in our comments that the LPP is not 100 percent reliable. Examples of public concerns regarding costs are in BOR's Scoping report: (see Coalition comments on BOR's Scoping Report Appendix B).

3.4.22 Proposed Project Cost (Other), page 11

"*A total of 41 comments were received that addressed proposed LPP Project costs. Many of the commenters were concerned with the cost of the proposed LPP Project to taxpayers and the overall cost of the proposed LPP Project. Several questioned whether residents of Washington and Kane County would fund the proposed LPP Project, or if the entire state would provide funds. Additionally, many suggested that a water conservation alternative would save taxpayer money and avoid the proposed LPP Project altogether."*

Coalition: The 2006 Lake Powell Pipeline Development Act[128] also poses problems when it comes to cost issues, as described in the 2019 Legislative Audit [129]:

"The Lake Powell Pipeline Development Act leaves questions unanswered concerning repayment of pipeline costs to the state. These uncertainties in the act's repayment requirements could seriously impact the state's repayment revenues and the district's ability to pay."

Things have changed since the Utah legislature passed the 2006 *Lake Powell Pipeline Development Act*. The cost of LPP has grown significantly since it was first conceived. In 1995, the price was estimated at $187 million, in 2001 it was $257 million, in 2006 it became $354 million, it skyrocketed to $1.8-$3.2 billion in 2012, and in 2016 it was readjusted again to $1-2 billion.[130] Meanwhile, mid-century population projections have plummeted from 860,000 to less than 500,000, reducing demand. Yet, the proponents still push for the same amount of water for about half the proposed population.

The DEIS is deficient because the BOR uses the Act but doesn't do a financial analysis that would be a piece of standard information in any EIS for the public in a socioeconomic study.

---

128 Utah State Legislature, UC 73-28-101, Lake Powell Pipeline Development Act, 2006, at: https://le.utah.gov/xcode/Title73/Chapter28/C73-28_1800010118000101.pdf.
129 Office of the Legislative Auditor General, Audit Report No. 2015-01, (p. ii), "A Performance Audit of Projections of Utah's Water Needs," at: https://le.utah.gov/audit/15_01rpt.pdf.
130 Lake Powell Pipeline. April 2016 Final Study Report 10 – Socioeconomics and Water Resource Economics. Appendix B: Draft Cost Opinion Master Summary. Capital cost estimate in December 2015 dollars. Prepared by Stantec, February 2016.

The Act puts all the burden on Washington County residents to pay for the LPP but doesn't provide explicit provisions on how the residents or the state can pay for LPP. The 2015 Legislative Audit of the Division of Water Resources[131] addressed the question of cost and alternative water management policies and outlined their concerns with the Act:

> *"State policymakers need assurances that when they support costly, large-scale water projects, the need for additional supply is real, and the state's investment is sound."* (p. 9)

> *"Unless water demand is reduced, new sources of supply will need to be developed and delivered from greater distances, resulting in increased costs. Given these costs, policies aimed at reducing per capita water use need to be prioritized."* (p. 36)

Also not adequately considered is the cost of repairing and maintaining existing infrastructure, which should receive priority.

> *"Local and regional water managers describe a growing deficit in major system repairs and replacements with an estimated total cost of $18 billion. It is unclear which portion of these costs will be paid for by existing sources of revenue and which portion will require new sources of revenue."* (p. 40)

3.20.1.4 Water Supply Reliability Benefits, page 240.

> *"Water supply reliability benefits are an important consideration in an evaluation of the water supply benefits of the LPP. Additional supplies provided by the LPP will reduce potential gaps in supply and demand in the future as well as decreasing the potential for shortage events at any particular time. Water reliability benefits in the WCWCD are estimated using previously completed studies of water supply reliability benefits. Use of previously estimated benefit values as a basis for estimating benefits is an application of benefits transfer. Several studies have been completed in several states that have estimated water reliability benefits and the benefits of avoiding water supply shortages. The household benefits from avoiding a shortage, or increasing water supply reliability, are estimated to range from about $89 to $360 per household per year, with a best estimate of $300 per household per year. Water reliability benefits to commercial establishments were estimated to range from $360 to $1,800 per establishment per year, with a best estimate of $1,800.*

> *"Water supply activities associated with the No Action Alternative are aimed at maintaining current conditions in the near future and do not address potential reliability issues that could occur in the long-term future. Therefore, water reliability benefits are not likely to be generated under the No Action Alternative because long-term potential gaps in supply and demand would remain as they currently are. Other methods, such as conservation, could be*

131 Office of the Legislative Auditor General, Audit Report No. 2015-01, (p. ii), "A Performance Audit of Projections of Utah's Water Needs," at: https://le.utah.gov/audit/15_01rpt.pdf.

implemented to address future supply and demand gaps, but these methods would not generate reliability benefits as measured by willingness to pay."

Coalition: As mentioned in the above section, the only analysis in the DEIS is of water reliability benefits is not sufficient. It assumes the LPP is 100 percent reliable and it is not.[132] The DEIS is using the IMPLAN model which is a commonly used model to evaluate public projects, but input-output models are a poor choice for analyzing economic impacts (and economists rarely use them). They are more accurate for small projects but should not be used for large projects with huge impacts on the local economy because the model assumes fixed coefficients per definition. For example, the city of St George could hire a local excavation company to dig the hole for a public swimming pool. But it is ridiculous to think that a local company could easily expand their businesses and equipment and add staff to build the pipeline. The result is that much more money would flow to outside companies and workers for the pipeline, compared to small projects, which means more money would leave the local economy (and state) than predicted by the model.

The DEIS treats the $2 billion as if it dropped from the sky. But the money is a loan that has to be paid back to the state of Utah, which means less consumer demand for other things. It is equivalent to buying a house for $510,000 and take out a mortgage for $500,000. It may seem the day you sign the contract that you are $500,000 richer since you now have this fine house, but, of course, you have to start making mortgage payments which is an additional cost to you.

3.20.1.5 Economic Costs, page 241.

"The economic costs of the No Action and the LPP alternatives include all resource costs associated with projects and activities. These costs include construction costs; energy costs; operation, maintenance and replacement (OM&R) costs, and interest during construction (IDC). Total construction costs for the Southern Pipeline Alternative estimated by Stantec, excluding the Kane County System, are estimated to be $1,480.5 million and total construction costs for the Highway Alternative, again excluding the Kane Pipeline County System, are estimated to be $1,433.0 million.

"Under the No Action Alternative, the Project Proponent would not incur the costs of the Proposed Project but would still need to supply water. The estimated costs of that supply are based on the estimated costs of the Ash Creek project, Sand Hollow Regional Pipeline, and various well projects presented in a 2017 Regional Water Impact Fee Facilities Plan & Analysis for the WCWCD (Zions Public Finance and Applied Analysis 2017). The costs of these projects indexed to 2019 using the gross domestic product price deflator is $82.5 million. 242 OM&R estimates provided by Stantec for the Southern and Highway Alternatives are estimated to be $5.120 million annually in 2019 dollars and pumping energy costs are estimated to be $4.096 million annually, for total annual costs of $9.216 million."

132. Harding, B., Memorandum prepared for Conserve Southwest Utah: "Lake Powell Pipeline, Draft Environmental Impact Statement", Lynker Technologies, LLC, July 28, 2020 (see Appendix C).

Coalition: OM&R costs for the No Action alternative were not presented in the 2017 Zions Public Finance and Applied Analysis report but using the same percentage of annual costs relative to construction cost as for the Southern and Highway Alternatives results in annual No Action OM&R costs of $471,300. Interest during construction represents the difference between funds appropriated for construction and the economic cost of capital invested in the project when the project is brought into service at the end of construction. This difference represents an economic cost that must be included in an economic justification and can be thought of as an opportunity cost for funds that could be invested elsewhere if they were not tied up in project construction. Interest during construction should be considered as part of project costs regardless of the source of project funds, unless the project is entirely funded through existing equity accounts.

The DEIS is not sufficient because its socioeconomic analysis makes the wrong assumption. The public has asked for years to disclose what costs fall on them to pay. Costs to residents which the DEIS fails to disclose the costs residents must pay for the LPP and they include:

1. Increasing Water Rates

According to a 2019 Legislative Audit, WCWCD plans to pay for the LPP in part with an increase in water rates:[133]

> *"WCWCD's ability to charge higher impact fees are a key assumption to the growth in revenue.*
>
> *"In the model, water rates were increased according to WCWCD's plans, [from $0.84 per 1,000 gallons by] $0.10 per 1,000 gallons a year to $3.84 per 1,000 gallons by 2045. This increase would amount to a 357 percent increase over a 30-year period to the wholesale rate, $0.84 to $3.84 per 1,000 gallons."*

The increased water rates and property taxes coupled with population growth rapidly increase potential revenue, but economic problems such as a recession could make it difficult to repay debt, as required by the state.

Although raising water rates could potentially produce more revenue, it could also reduce demand for water resulting in awkward revenue decreases. Twenty-two Utah economists from the University of Utah and Brigham Young University analyzed the feasibility of the LPP and its effects on Washington County[134]. They addressed the issue of price elasticity in their analysis:

> *"Due to the fact that the price elasticity of demand for water is estimated to be -0.5, repayment through water sales alone would require rate increases of 1665–1995 percent (cell B12). This enormous increase in water rates would lead Washington County water users to need less water in 2060 than they used in 2010 (cells O12 and AA12 of the "Water Demand" worksheet), meaning that there would be no need for the water supplied by the LPP. In other words, if the LPP is financed only by increasing water rates, water would become so expensive that future water demand would drop below the current water*

133. Office of the Legislative Auditor General, "A Performance Audit of the Repayment Feasibility of the Lake Powell Pipeline", August 2019, p. 21, at: https://le.utah.gov/audit/19_05rpt.pdf.
134. "Lake Powell Pipeline Economic Feasibility Analysis for Washington County, UT", October 2015, p. 7-8, at: https://www.stgeorgeutah.com/wp-content/uploads/2015/11/2015-Lake-Powell-Pipeline-Economic-Feasibility-Analysis.pdf.

demand of WCWCD, even if one ignores other water sources identified above."[135]

2. Impact Fees

According to a 2019 Legislative Performance Audit[136]**:**

> *"Washington county already has some of the highest impact fees in the state, but planned increases will nearly double the fee from 2018 to 2025. Our model assumes WCWCD will carry out its planned increases from $9,417 in 2019 to $15,448 by 2026 as planned. While we cannot project what the highest impact fee will be, it will likely increase once the final cost of the LPP is determined."*

and:

> *"Washington County has some of the highest water impact fees in the state; its ability to charge even higher fees is a key assumption for revenue growth."*

After 2026, the models assume the fee will gradually increase. The ability to raise rates will affect the WCWCD's ability to repay the loan. The revenue sources are susceptible to future uncertainly. The LPP Act does not fully define how the state will be paid back for the full cost of the LPP, which will need to be clarified. Since all the costs of LPP are not known, the ability of WCWCD to be able to repay the loan could be questionable.

3.3 Noise and Vibration, 3.3.1 Affected Environment, page 60.

> *"For the purposes of this evaluation, the affected environment is considered land use or receptors within 750 feet of construction of the proposed alternatives. The Federal Highway Administration (FHWA) uses this distance for evaluating noise effects from proposed improvement projects (FHWA 2010). Even though the affected environment is considered as 750 feet from the Proposed Project alternative alignments, receptors as far as 2,278 feet away were evaluated as a precaution. Table 3.3-1, below, provides a summary of human receptors identified within the affected environment. Table 3.3-2, below, describes the wilderness and recreational areas within the affected environment, which have been identified with potential for presence of wildlife receptors. Appendix C-3, Noise and Vibration, includes additional details related to the affected environment."*

Coalition: The DEIS is not sufficient because it only evaluated 750 ft. from the pipeline; it didn't consider the impacts from all the permanent infrastructure that will be built to support the operation of the pipeline.

---

135. "cell" references pertain to the spreadsheet that accompanied their report to Governor Herbert, House speaker, and Senate president.

136 Office of the Legislative Auditor General, "A Performance Audit of the Repayment Feasibility of the Lake Powell Pipeline", August 2019, p. 29, at: https://le.utah.gov/audit/19_05rpt.pdf.

Lake Powell Pipeline Project Appendix B: Purpose and Need Analysis

Introduction, page 1.

> *"The overall objective of this report is to assess the water needs of the Project Participants, determine to what extent the Lake Powell Pipeline (LPP) Project would meet those water needs, and define the purpose and need statement for the LPP Project Draft Environmental Impact Statement (DEIS). This report outlines the process used to determine the underlying need to which the Bureau of Reclamation (Reclamation) and the cooperating agencies are responding and Reclamation's vetting of that process."*

Coalition: However, the BOR failed in its obligation to be objective and follow the intent of 43 CFR §46.420 by not vetting the proponents' claims. BOR adopted the claims of proponents without evidence and did not ask for missing data to support the proponents' claims that water from the Colorado River is a reliable source.

The assumption in the DEIS is that the proponents need a second source of water from the Colorado River as a solution. But, the DEIS doesn't provide any independent analysis on the problem this "solution" is attempting to solve and ignores the over-allocation and declining flow of the Colorado River as that potential "solution." The proponents have been making similar claims for about 14 years and the BOR is allowing that to continue without vetting it, to the detriment of the 40 million people and businesses that are using every drop of Colorado River today.

2.1 Project Proponent Objectives, page 2.

> *"The UBWR proposes building the LPP to meet future water demands through 2060 and beyond. In addition, the LPP is intended to achieve other prudent planning objectives, consistent with the UBWR's mission (UBWR 2019; UDWRe 2019), which include:*
>
> *"1. Diversifying the regional water supply portfolio by providing a second source of water for Washington County;*
>
> *"2. Providing for system reliability by developing a secure source of water;*
>
> *"3. Providing for system redundancy in the event of system failure due to disasters or aging infrastructure;*
>
> *"4. Accounting for climate change scenarios; and*
>
> *"5. Accounting for long-term uncertainty when considering the summed effect of the vulnerability to the water supply. Other large water districts/suppliers in Utah that operate and maintain some of Reclamation's federal projects have similar objectives in both their day-to-day and long-term plans (e.g., Jordan Valley Water Conservancy District 2019)."*

Coalition: We question this wish list of unrealistic expectations of the Colorado River. The use of public funds without careful analysis of the ability of Colorado River to fill these objectives is not in the best interest of the public. Neither the proponents nor the BOR have done their due diligence on the LPP water right to see if it is suitable for a 50-year water exchange contract. Objectives 1 and 2 emphasizing reliability, security, and redundancy of water resources are puzzling because nowhere in the DEIS is there a comprehensive analysis of the risk of Colorado River flows declining to the point where Utah's Upper Basin allocation is too small to even fill the LPP.

3.12 Wetland and Riparian

Coalition: Proposed pipeline crossing of creeks and other riparian systems is very much ill-advised. There have been very few successful restoration projects that support the conclusions in the DEIS. Instead, uncontrollable weeds will be introduced, and typical "restoration" practices will involve using completely inappropriate seed and other plantings. Riparian areas represent the most critically endangered of all habitat types in the state. Losing three acres of riparian habitat under the Southern Alternative (3.12.2.2) is unacceptable.

3.13 Special status plants

Coalition: At paragraph "3.13.1.3 Existing Conditions" six special status plants are noted as occurring in the project area.

Inadequate surveys however for *Mentzelia memorabilis* have occurred in Utah where it has only been known since 2016 (and in fact the BLM in Utah needs to add it as a sensitive species for Utah as it has been designated in Arizona, and this needs to be done before this project continues). It has a G1 NatureServe ranking.

Mentzelia memorabilis is ranked as critically imperiled in Arizona and it occurs also with two additional species that should be also considered as sensitive and which have not been surveyed: *Phacelia hughesii* (G1 on NatureServe) and *Tetradymia canescens* var. *thorneae* (which actually may represent a new, undescribed species). The area where these occur in Utah near section 48 needs to be designated as an ACEC, and more surveys need to be undertaken.

Two rare Arizona plants that occur near where the pipeline might be placed near Fredonia are: *Eriogonum mortonianum* (NatureServe G1) and *Eriogonum thompsoniae var. atwoodii* (NatureServe G4T1) in addition to *Cryptantha semiglabra*. Pipeline placement needs to completely avoid the habitats of these species.

The Utah sensitive gypsophile *Petalonyx parryi* will occur in areas similar or near the ESA listed *Pediocactus sileri* which is directly in the path of the pipeline in several places. *P. parryi* has already suffered very significant habitat losses in Bloomington, St. George and near the city of Washington, and also as a result of the Southern Corridor project. No more plants should be lost.

3.14 Sensitive Species – Fish and Wildlife

In reference to table 3.14-2:

(1) In the discussion of the Monarch butterfly, it should be noted that there is a wealth of *Asclepias* species that occur in the project area and which should be avoided which include:

- *A. asperula*

- *A. erosa*
- *A. hallii*
- *A. labriformis*
- *A. subverticillata*
- *A. tuberosa*
- *A. rusbyi*
- *A. speciosa*
- *A. welshii*

The Monarch butterfly requires species of *Asclepias* on which to lay its eggs (and it needs a healthy selection of other native plants that co-occur to provide adults with nectar, etc. - it is the whole ecosystem that has to be considered and not "just" protection of the milkweeds nor simply growing them). More attention needs to be given to the protection of these species and other co-occurring flowering plant species. Your reference to "poison milkweed" is unclear. All species of *Asclepias* contain toxins that could be considered poisonous. Many plants have poisonous mechanisms to defend themselves. This does not mean they are weeds nor that they should be legally declared as noxious. If you are referring to *A. subverticillata* (known also as Whorled milkweed, but scientific names are always required when making reference to plant species), that is a native species that does not meet the normal definition of "noxious" even if so designated (and it is not a state designated noxious species). We note that Washington, San Juan and Iron Cos. may have apparently declared it as locally noxious in their respective counties, which does not mean that species should be destroyed wherever found because it is a natural component of the ecosystem in natural areas. Aerial or other sprays should be rarely if ever used and especially not around these plants and their pollinators. Those sprays also represent death to beleaguered bee species in particular and degradation of ecosystems.

(2) In the discussion of *Bombus occidentalis*, you indicate that "western bumblebees are likely to be rarely encountered in areas where there are flowering plants and crops." How does this statement relate in any way to the pipeline project? Also, that comment is unsupported by the provided Xerces link. The historic range of *B. occidentalis* does include Washington County and its recent presence has been confirmed in several places in Utah, and it is believed to be in severe decline.

3.15 Threatened and Endangered Species

The draft DEIS has failed to identify the occurrence of the ESA listed *Pediocactus peeblesianus* var. *fickeiseniae* (which will soon be changed by the USFWS to "subsp." rather than "var.") and it appears to have a very likely conflict with the preferred pipeline alignment. This species has been reported from Utah for quite some time and should have been documented long before now and has just this year been verified to in fact occur in Utah. Survey crews however were dispatched too late and failed to find any plants because they shrink into the ground and become impossible to find as temperatures rise. They must be surveyed from roughly late March to mid-May, and in more than one year. Plants of this rare cacti have been verified to occur in southeastern Washington County, but have also been reported from western Kane County where survey efforts also need to be made.

The DEIS is therefore insufficient until thorough surveys have been conducted.

Impacts to the habitat of *Pediocactus sileri* have already been extensive and the reason why no impacts to its critical habitat would occur is because no critical habitat was ever designated for that species because the USFWS has had a policy of not designating critical habitat for cactus species that now works to the detriment of this species. No direct impacts whatsoever should occur to *Pediocactus sileri* nor to the often-thick biologic soil crusts upon which it frequently depends. Like *Petalonyx parryi*, *P. sileri* has suffered significant losses already, not the least of which relate to the development of the area near White Dome.

Salvage and seed collection for these and other rare plants are inadequate conservation measures; their occupied habitats **must** be protected.

3.2.1 Water Supply, page 4.

> *"The WCWCD primarily derives their water supply from surface water resources (Virgin River), although some groundwater sources provide a portion of their supply. In addition, the UDWRe developed the Virgin River Daily Simulation Model (VRDSM) to estimate reliable yield for WCWCD's supply. The VRDSM now includes a climate change component for the surface water supplies. Vetting WCWCD's supply information, therefore, included reviewing the VRDSM assumptions and inputs, outputs, and resulting data."*

Coalition: The DEIS did not identify all potentially available sources in Washington County. BOR must quantify the total available water supply and include reasonable increases in yield from sources other than WCWCD's supply (i.e., cities, irrigation companies, private landowners, etc.). BOR believes Washington County's water supplies are not secure, even though we have dozens of wells, surface diversions, water retailers, and surface and underground reservoirs within the 2,800 square miles of the Virgin River watershed not included in the DEIS's water supply analysis.

Handling the Demand with Local Supplies

UDWRe's Water Needs Assessment 2011[137] stated that the county by 2060 would grow to a population of 860,378. However, over the years, population projections for 2060 have been lowered to 468,830. Oddly, state studies have also continued to decrease local supply without any explanation, perhaps to continue to justify a need for the LPP. Even though the population projections fell almost in half, the proponents still claim they need the same amount of water. The vetting by the BOR of assertions by the proponents is not evident in the DEIS.

Pertinent to that question is that UDWRe's and WCWCD's assessment that the water supply has decreased substantially. Table 5, extracted from the Water Needs Assessment reports for 2008 and 2016, shows reported supplies in Washington County decreasing by more than 45,000 AFY from 2008 to 2016. It appears that the 2008 WNA shows much more water available than 2016. There are also gaps in the sources, such as Kolob Reservoir, Meadow Hollow Reservoir, Gunlock to Santa Clara Pipeline, Quail Creek Reservoir Agricultural Exchange, and Sand Hollow Well Field Expansion. Quail Creek & Sand Hollow Reservoir quantities have decreased significantly since 2008, as has Sand Hollow Ground Water. The last column shows the

maximum of 2008 and 2016, with almost 180,000 AFY available. It is essential that BOR demand that the LPP proponents explain in detail:

- What are the storage constraints and why those cannot be overcome before approving the LPP?
- Why the potential reuse number has come down so much?
- What happened to the water sources that appeared on 2008 water supply table but don't appear on 2016 tables?
- Why agricultural conversion is less in 2016 than in 2008 - land already developed? water included in M&I numbers now?

Table 5. Water sources from Water Needs Assessments in 2008 and 2016.

Supplies (existing & potential)	Use	2008 WNA (AFY)	2016 WNA (AFY)	Max of 2008/2011
Quail Creek & Sand Hallow Reservoirs	Culinary	29,500	24,922	29,500
Sand Hollow Ground Water	Culinary	8,000	4,000	8,000
Kolob Reservoir	Culinary	2,000		2,000
Meadow Hollow Reservoir	Culinary	200		200
Cottam Well Field	Culinary	2,000	600	2,000
Sullivan Well Field	Culinary	750	750	750
Pintura Well	Culinary		600	600
Diamond Valley Well	Culinary		400	400
Kayenta (Ence Wells) System	Culinary	1,000	730	1,000
Gunlock to Santa Clara PL	Secondary	2,500		2,500
Toquerville Sec Water Sys	Secondary	160	178	178
Ash Creek PL	Culinary	5,000	2,840	5,000
Crystal Creek PL	Culinary	2,000	2,000	2,000
Quail Creek Reservoir Ag Exch	Culinary	4,000		4,000
Sand Hollow Well Field Expansion	Culinary?			-
Sand Hollow Recharge & Recovery	Culinary?		3,000	3,000
Cottam Well Maximization	Culinary		600	600
Westside Arsenic Treatment	Culinary		5,000	5,000
Subtotal WCWCD Sources		**57,110**	**45,620**	**66,728**
Municipal Supplies (2016 WNA)		35,425	35,425	35,425
Maximize Existing Wastewater Reuse	Secondary	1,700	7,300	7,300
Ag Conversion from Development	Secondary	12,400	10,080	12,400
Existing Wastewater Reuse	Secondary			-
Potential Future Wastewater Reuse	Secondary	54,500	17,380	54,500
Total		**161,135**	**115,805**	**176,353**

REUSE

The proponents have rejected reuse because of the cost of reverse osmosis (RO), but already other areas are putting more effort into developing reuse facilities, some with different and less expensive technologies. Altamonte, Florida has developed a reuse system[138] that provides potable water at half the cost of older RO technology, but the state and this DEIS continue to base the high cost of conservation alternatives on the older, more-expensive RO process.

From PureAlta's information sheet:

> *"Traditionally, Reverse osmosis (RO) membranes have been a component of treatment systems used for the production of purified water; however, a concern with RO is its high energy consumption along with the need to dispose of the concentrated waste that is a byproduct of this treatment process. In order to mitigate issues associated with RO, the City is testing the O3/BAF process which uses less energy, does not produce a waste stream and successfully removes the similar trace organic compounds as RO membranes."*

The "Framework for Potable Use in Florida"[139] explains:

> *"The water present today is the same water as existed with the dinosaurs and it will be the same water that exists with future generations. Whatever its source, the technology exists to treat it for any purpose, including drinking.*
>
> *"Potable reuse has emerged as a viable alternative water resource for some entities because the cost of development of potable reuse has become competitive with other alternative water sources such as brackish and saline sources.*
>
> *"The cost of producing potable reuse has become comparable to the costs associated with some of the other water supply alternatives, allowing potable reuse to emerge as another viable alternative water supply source in Florida."*

In June 2019, Mayor Dawn Ramsey of South Jordan City presented information to Governor Herbert's Executive Water Finance Board regarding South Jordan's water reuse project[140]. South Jordan is the 12th fastest growing city in America, and as with all cities, water is important. Her presentation emphasized that States country-wide are working to provide the necessary regulatory framework for potable reuse. A South Jordan team toured projects in California and Arizona to study reuse generally and Texas where they are employing reuse projects to supplement their drinking water supply. They found the system used in Altamonte, Florida, to be very innovative and a cheaper reuse project. South Jordan has fashioned a reuse pilot project on Florida's system. Mayor Ramsey emphasized in her presentation that:

> *"The project received a 2018 Market-Changing Water Technology award from the International Water Association in Tokyo, Japan, and was the only pilot honored from the U.S. The project also won the 2017 WateReuse Innovative*

138. https://www.altamonte.org/DocumentCenter/View/5245/pureALTA-Info-Sheet
139. http://www.watereuseflorida.com/wp-content/uploads/Framework-for-Potable-Reuse-in-Florida-FINAL-January-2020-web10495.pdf
140. https://www.utah.gov/pmn/files/505541.pdf

Project of the Year at the nation's preeminent water reuse conference in Phoenix, Arizona."[141]

Colorado has also made great strides in water reuse to bolster their water resources. Their 2017 "A Survey of Key States' Regulatory Approaches to Water Reuse"[142] reports:

> *"Drivers for reuse vary among and within states. Frequent motivators include* ***drought resiliency****,* ***addressing water scarcity****, increasingly stringent effluent discharge requirements,* ***cost-competitiveness****, and* ***resource sustainability****. As an inland state with a rapidly growing population and limited new water supply options, reuse is an* ***increasingly cost-competitive*** *means of stretching water supplies in Colorado to meet greater demands. In contrast, Florida is a coastal state, but it also has water supply concerns. In Florida significant concerns about environmental impacts to groundwater and coastal waters have led to mandatory reductions in effluent discharges through ocean outfalls, helping drive reuse in that state. While specific drivers among states may vary, all states surveyed are experiencing a growing interest in reuse including potable water reuse."* (emphasis added)

In an interview with the Public Policy Institute of California[143] University of New Mexico professor and co-author of *Science Be Dammed*, John Fleck, was asked, "What are the main reasons Californians are using less Colorado River water?" He described the experience of California's Metropolitan Water District (MWD):

> *"There was a lot of progress in conservation during the latest drought, and even after it ended. We're seeing a lot more effective use of water in the basin, with a growing emphasis on groundwater recharge, stormwater capture, and reuse efforts."* (emphasis added)

Figure 3, a table reproduced below from Western Resource Advocates' 2016 submittal[144] to the Federal Energy Regulatory Commission regarding the proposed LPP shows that with reuse our county's secondary water supply is projected to include up to 27,620 AFY reuse water much of which can be converted to potable—although this 27,620 AFY number may decrease with lower population growth and reduced water use due to conservation.

141. https://www.altamonte.org/754/pureALTA
142. https://westernresourceadvocates.org/publications/a-survey-of-key-states-regulatory-approaches-to-water-reuse/
143. Public Policy Institute of California, interview with John Fleck, author of Science be Dammed, How ignoring Inconvenient Science Drained the Colorado River, March 2, 2020, at: https://www.ppic.org/blog/why-the-big-drop-in-californias-coloradoriver-water-use/
144. WRA, "Comments on the Preliminary Licensing Proposal for the Lake Powell Pipeline, Project No. P-12966-001", February 29, 2016, at: https://elibrary.ferc.gov/idmws/file_list.asp?accession_num=20160301-5013.

Table 2. According to the project proponent's assumptions, Washington County's planned future water supplies in Washington County will total over 123,000 acre-feet annually (AFY) by 2060 without the Lake Powell Pipeline. All figures have been rounded to the nearest 10.

	Potable (AFY)	Secondary (AFY)	Potable + Secondary (AFY)
Current Supplies	74,560	7,450	82,010
Future Supplies by 2060:			
Ash Creek	3,830		
Planned Agriculture Transfers		10,080	
Planned Reuse		27,620*	
Future Supply Totals	78,390	45,150	**123,540**

*Considered a maximum.

Figure 3. Washington County water supplies acknowledged by WRA.

The Local Waters Alternative reuse volume shown in Figure 4 reflects the lower level of water reuse under a 1 percent conservation scenario. Agricultural land transfer and conversion due to growth is predicted to be greater than what was predicted in Draft Study Report 19[145]—10,080 AFY.

Table 7. Total Future Water Supplies in the Local Waters Alternative ranges from 116,300 – 138,000 AFY, exceeding projected demands after conservation (about 115,000 AFY). All values have been independently rounded to the nearest hundred.

Supply Alternative:	Culinary (AFY)	Secondary (AFY)
WCWCD Current Supplies and Ash Creek	78,400	7,500
Reuse		16,900
Agricultural Water Transfers		13,700 - 35,200
Sub-Totals	78,400	38,000 – 59,600
Total	116,300- 138,000	

Figure 4. LWA's future water supplies with lower reuse due to conservation and reasonable agricultural water transfers.

145. https://conserveswu.org/wp-content/uploads/2018/03/FERC-Water-Needs-ASSESSMENT-19-5-5-16-1.pdf.

One would think with all the good reuse projects across the country that Utah would be on board. However, in 2006, the same year the Lake Powell Pipeline Development Act was passed, Utah's Reuse Act[146] was revised, making reuse project approval more difficult.

Prior to that, in 2005 "Water Reuse In Utah"[147] was published by the Utah Division of Water Resources (overseen by LPP proponent UBWR) and stated:

> *"Most of the easily obtainable sources of water have already been developed, and in some areas, other than potential water reuse projects, only large trans-basin diversions remain to meet future increases in demand. The population of the state is increasing, and as a result, water demand continues to rise. The potential for water reuse to meet some of this demand is promising and implementation of reuse is already occurring.* ***Eventually, water reuse will become an essential element of many communities' water supplies. Consequently, the question with respect to water reuse is not if it will become commonplace, but when and how much****."* (emphasis added)

In spite of this acknowledgement, the Reuse Act[148] was changed in 2006 and the Proponent moved full speed ahead with their effort to secure Lake Powell water and pushed the Utah legislature to pass the Lake Powell Pipeline Development Act.[149]

Table 1.2-1 Water Supply and Demand Figure shown below indicates that 184,513 AFY of water would be needed by 2060, but that's driven by an artificial demand to serve the additional population in 2075, and an excessive "system loss" factor of 15.4 percent. The 98,727 AFY shown for the Median climate change type would serve a population of nearly 600,000 at a usage of around 150 gpcd, but the Proponent's usage by 2060 would be 240 gpcd—far more than necessary and more than is being used currently by other desert communities. The 98,727 AFY does not include agricultural conversion above 10,080 AFY—water that the Local Waters Alternative forecasts will only increase as Washington County grows. It also does not include the additional resources from reuse opportunities mentioned earlier.

146. https://le.utah.gov/xcode/Title73/Chapter3C/C73-3c_1800010118000101.pdf.
147. https://water.utah.gov/wp-content/uploads/2019/12/Water-Reuse-in-Utah-Water-Resources-2005.pdf.
148. https://le.utah.gov/xcode/Title73/Chapter3C/C73-3c_1800010118000101.pdf.
149. https://le.utah.gov/xcode/Title73/Chapter28/C73-28_1800010118000101.pdf.

Table 1.2-1 Water Supply and Demand for Washington County Water Conservancy District under Different Climate Change Scenarios, Ranging from Hotter and Drier to Warmer and Wetter

WCWCD Reliable Annual Water Supply (acre-feet)[a]	Climate Change Scenario[b]	Climate Change Type	WCWCD 2060 Demand and Reserve (acre-feet)	WCWCD 2060 Supply Deficit (acre-feet)
71,516	10th	Hotter, Drier	184,513	112,997
88,022	30th			96,492
98,727	50th	Median		85,786
112,196	70th	Warmer, Wetter		72,318
130,888	90th			53,625

Notes:
(a) Average yield with up to 10% shortage represents reliable yield for WCWCD projects.
(b) Virgin River natural streamflow scenarios provided by Reclamation demonstrate the effect of climate change to reliable annual water supply (Reclamation 2014).
Key:
WCWCD = Washington County Water Conservancy District

Figure 5. Water Supply and Demand from WCWCD.

In fact, UBWR's 2016 Water Needs Assessment[150] shows the limitations to Washington County's current reuse and its maximum annual yield of only 7,800 AFY is far less than even the 16,900 AFY amount that the Local Waters Alternative shows, which includes additional supplies resulting from 1 percent conservation per year providing less water for reuse.

Reuse offers significant opportunities for Washington County's future.

3.2.2 Water Demand, page 4.

> *"Base annual water demand was based on population projections from the University of Utah Kem C. Gardner Policy Institute (Gardner Institute 2017). Other factors were included as well for the WCWCD, including water usage rate (gallons per capita per day [gpcd]), conservation, system loss, and a 15-year reserve planning buffer. Factors for KCWCD were the same except for conservation and the lack of a 15-year buffer. Vetting demand information, therefore, included determining whether estimates and the approach (e.g., rate of conservation, inclusion of a reserve buffer) were reasonable in light of the Districts' need to provide reliable water supplies to customers in their service areas and also plan against uncertainties related to climate change, reductions in water quality, reliance on a single source, unexpected population growth or economic expansion, and potential interruptions in supply."*

Coalition: The DEIS explains on page 245 that water use will go down by 24 percent due to price hikes, so water needs will be much lower. However, this isn't reflected in the DEIS analysis. The proponents assert without evidence that conservation gains below 240 GPCD cannot be considered after 2045, again perhaps to show a need for LPP. Further, the reduced demand as a result of increased water pricing will further lower use, which will make it more difficult to pay for the LPP.

150. https://conserveswu.org/wp-content/uploads/2018/03/FERC-Water-Needs-ASSESSMENT-19-5-5-16-1.pdf.

The DEIS contradicts the proponents' assertion in this section. It states:

> *"Additional Potential Effects, DEIS page 245."*
>
> *"Assuming a long-run price elasticity of demand for domestic water supply of -0.65, a 5.2 percent annual increase in water prices and an assumed increase in retail water charges over 30 years would result in a 3.38 percent annual decrease in water use per user. The Kem C. Gardner growth projection for the number of households to 2065 in Washington County was an average annual growth rate of 2.536 percent. Therefore, the combined effects of an increase in water prices and growth in the number of households at the above rates would lead to a decrease in overall demand of 24.7 percent. The No Action Alternative would result in less water for future use."*

Washington County's Local Water Demand (Use)[151]

Washington County's water use is excessive by the standards of western states. Figure 5, reproduced from the Utah Legislative Audit report in 2015, shows Utah's water use is the highest among the western states.[152]

151. M&I: Municipal and Industrial = Residential + Commercial + Institutional + Industrial, both culinary and secondary; all human water use excluding agriculture (crops and stock), which is all secondary. Almost all Washington County M&I use is metered; however secondary water is not.
152. Office of the Legislative Auditor General, Audit Report No. 2015-01, "A Performance Audit of Projections of Utah's Water Needs," page 28, at: https://olag.utah.gov/olag-doc/15_01rpt.pdf.

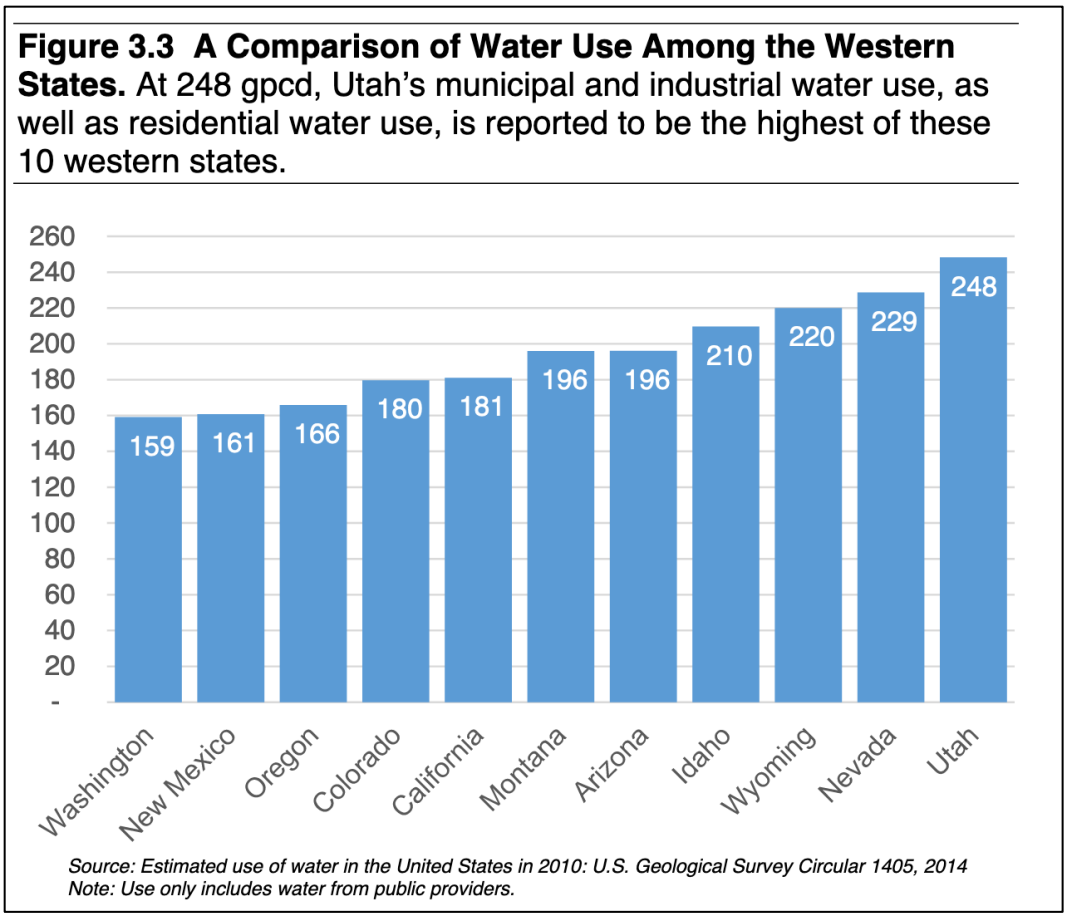


Figure 6. Comparison of water demand among western states.

A Washington County Water Conservancy District (WCWCD) June 2018 press release revealed that our 303 gallons per capita per day (GPCD) breaks down this way: [153]

> *"The data reports that Washington County residents used* ***143 gallons*** *per person daily (also known as GPCD – gallons per capita per day).* ***Factoring in all potable water use (second home, commercial, institutional and industrial), the total was 231 GPCD.*** *Unlike most other cities and states, Utah reports secondary (untreated) and reused water in its total GPCD numbers. Most of Washington County's* ***secondary water (72 GPCD)*** *is used to irrigate parks, cemeteries, and golf courses."* (emphasis added)

They estimated that 70 GPCD of the county's culinary treated water use was applied to residential landscaping. Dennis Strong, former director of the Utah Division of Water Resources, said in a video that if people in Southern Utah changed their landscaping, they wouldn't need the LPP.[154]

153. WCWCD, Press Release, June 15, 2018, at: https://www.wcwcd.org/wp-content/uploads/2018/06/2015-Water-Use-Numbers.pdf.
154. Utah Rivers Council, video recording, at: https://m.youtube.com/watch?v=oY_KXDS6hbQ.

The state and WCWCD assert that mandating conservation would severely restrict outdoor watering, which would impact the region's economy, environment, quality of life, and tourism. The Coalition does not see it that way nor, apparently, do other desert cities that have vibrant economies with tourism while continuing to reduce their water demand through effective conservation, and which use less water now than the state plans for our area in 2065.

Colorado River water diversions by Nevada, Arizona, and California have been declining, even as populations are increasing; even in St. George, increased population has used less water per capita over the past five years without any severe water conservation efforts.

The BOR has not considered new circumstances or technologies that can save water or yield more water from existing sources.

Washington County Water Demand – An Outside Analysis

Conserve Southwest Utah hired Peter Mayer of Water Demand Management, LLC (WaterDM) to analyze the DEIS regarding its assertions concerning water demand.[155] (See full report Appendix D.)

WaterDM is based in Boulder, Colorado, and is a water consulting firm providing expertise and services in the following areas:

- Municipal and industrial water use, research, and analysis
- Water conservation and demand management planning and implementation
- Integrated water resources planning
- Water loss control
- Analysis of municipal water rates and rate structures
- Drought preparedness and response
- Demand forecasting
- Evaluation of changes in demand
- Statistical analysis of water demand and modeling
- Meter technology implementation
- Meter and service line sizing

After reviewing the DEIS, WaterDM found the DEIS was deficient because the future water demand forecast for Washington County is grossly inflated for the following reasons:

1. A population forecast that increases by 293%;
2. An excessive level of per capita water use that would make Washington County water users among the highest in the US;

155. Mayer, P., "Expert opinion and analysis regarding water demands and statement of need for the Lake Powell Pipeline Project DEIS", September 4, 2020, Denver, Colorado, memorandum to Conserve Southwest Utah, at: https://www.waterdm.com/.

3. Improper inclusion and inflation of raw secondary irrigation water in the forecast by adding secondary irrigation company water to GPCD.
4. A 15.4% water loss factor which never improves and thus wastes approximately $300 million in value of the $2 billion-dollar project.

Per Capita Use Forecast

As part of the DEIS forecast, per capita water use (inclusive of all uses except system losses) starts at 302 gpcd in 2015 and is reduced by 20% to 240 gpcd by 2045. After year 2045 there are no additional efficiency improvements and gpcd is forecast to remain at 240 gpcd through 2075. The reasonableness of this forecast must be considered in the context of changes in water demands that occurred over the past 25 years and comparisons with other water providers in the Western US.

System Per Capita

Annual system per capita use is calculated by taking the total volume of water produced in a year for a water system and dividing that volume by the population and the number of days. Water production volumes are usually measured at water treatments plant before water is put into the distribution system and thus system per capita use typically includes system water losses that occur as water is transported to customers. The per capita use values presented in the DEIS are inclusive of all water use (residential, commercial, irrigation, etc.) with the notable exception of system water losses which the DEIS separates into a separate category.

Per Capita Use Has Declined Nationally

The US Geologic Survey publishes national water use data every five years and Figure 7 shows the public supply withdrawals in the US and population for 1950 – 2015, the most recent year for which data are available. Public supply withdrawals peaked in 2005 and declined in 2010 and 2015.

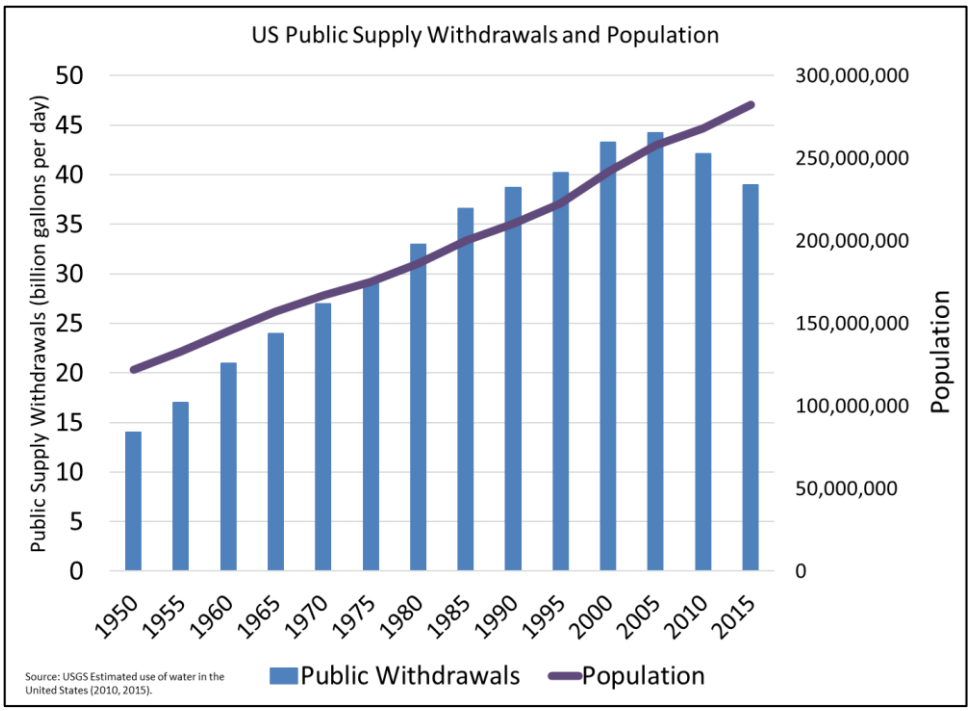


Figure 7: US Public Supply Withdrawals and Population, 1950 – 2015

Figure 7 shows the same US public supply withdrawals along with the average annual gallons per capita per day. Nationally, per capita use peaked in 1985 at about 184 gpcd and by 2015 had declined to 140 gpcd. The DEIS forecasts the 2075 gpcd in Washington County to be 71% higher than the national average in 2015.

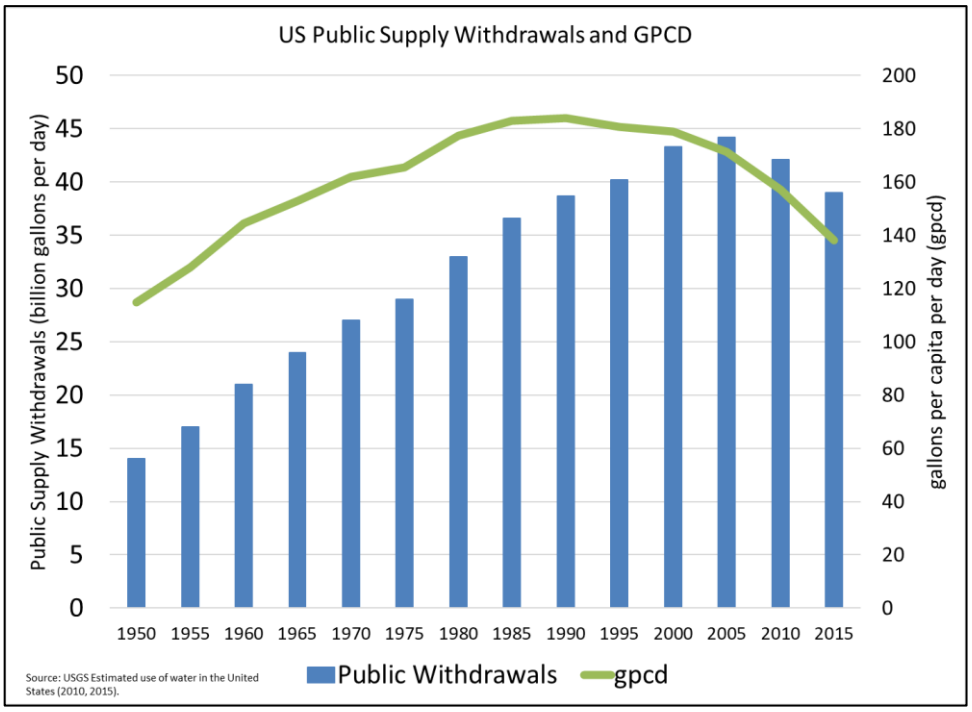


Figure 8: US Public Supply Withdrawals and GPCD, 1950 – 2015

Residential water use in Utah remains among the highest in the US according to the USGS as shown in Figure 9 which was prepared by the City of Tucson to understand how water use around the western US compares. This suggests Utah as a state, and Washington County as the highest water using region in the state, both have ample room for increased efficiency in the future. Downstream users on the Colorado River like California, Arizona and Nevada are paying attention. Water efficiency in the norm up and down the Colorado River basin as supplies have dwindled as a result of drought and climate change.

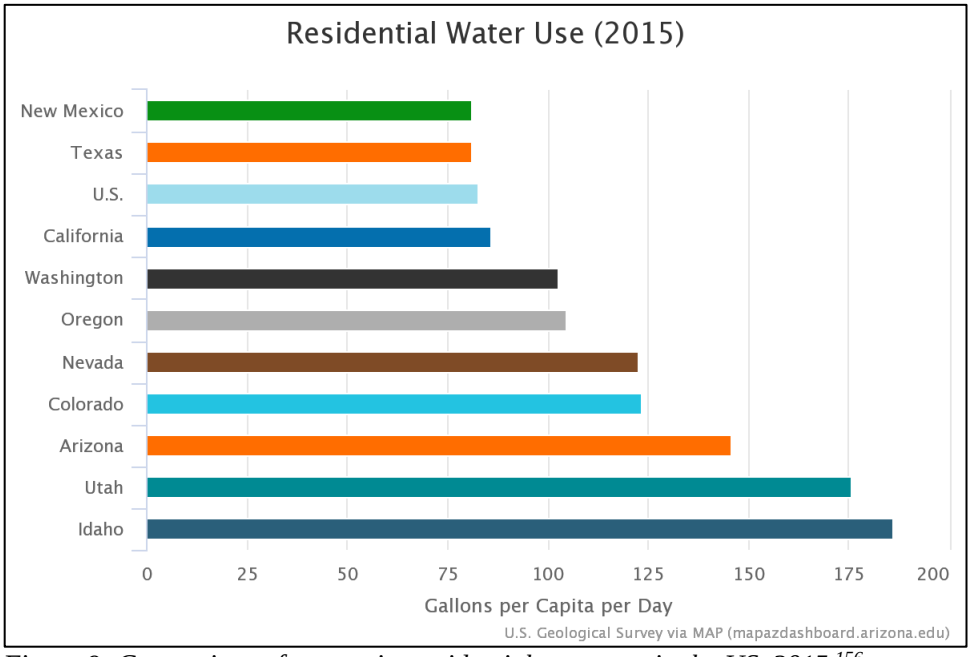


Figure 9: Comparison of per capita residential water use in the US, 2015.[156]

Per Capita Comparisons Show High Usage in Washington County

To better understand the scale of the forecast gpcd values in the DEIS, these data were compared against per capita use from cities that participated in the 2016 Residential End Uses of Water Study.[157] Per capita use was calculated for this study using the same approach as the DEIS with water losses explicitly excluded, but all other uses (residential, commercial, irrigation, etc.) included. The most "apples to apples" comparison of gpcd is to compared potable gpcd and this and other comparisons are presented in Table 6. In 2015, even potable water use by itself in Washington County averaged 231 gpcd, placing it among the highest levels of per capita use of comparable western cities as shown in Table 2.

It should be noted that most western cities have concluded that such a high levels of per capita water use are unsustainable (not to mention expensive) in arid environments and they have all implemented metering, conservation pricing and various other water

156. Making Action Possible for Southern Arizona, "Residential Water Use", accessed September 5, 2020 at: https://mapazdashboard.arizona.edu/infrastructure/residential-water-use.
157. DeOreo, W.B., P. Mayer, J. Kiefer, and B. Dziegielewski. 2016. Residential End Uses of Water, Version 2. Water Research Foundation. Denver, CO.

efficiency programs to reduce demand extend existing supplies. The DEIS in recognition of this, applies a steady reduction factor until a 20% reduction is achieved in 2045.

Even with the conservation factor applied, DEIS forecast total per capita use for Washington County in year 2075 is higher than any utility that participated in the 2016 Residential End Uses Study, including Scottsdale Arizona which in addition to having high water use also has a well-funded and staffed utility sponsored water efficiency program.[158]

[158] https://www.scottsdaleaz.gov/water/rebates

Table 6. Per Capita Comparisons		
Agency	**Population**	**GPCD**
Washington County WCD - 2015 potable + secondary + water loss	**151,360**	**348.2**
Washington County WCD - 2015 potable + secondary	**151,360**	**302.0**
Washington County WCD - 2075 potable + secondary + water loss forecast	**594,660**	**277.0**
Scottsdale, AZ – 2010 potable	217,385	273.1
Henderson, NV – 2010 potable	277,502	256.9
Washington County WCD - 2075 potable + secondary forecast	**594,660**	**240.0**
Washington County WCD - 2015 potable	**151,360**	**231.0**
Colorado Springs, CO – 2010 potable	441,000	212.3
Washington County WCD - 2075 potable forecast	**594,660**	**190.0**
Fort Collins, CO – 2010 potable	129,000	157.9
Denver, CO – 2010 potable	1,174,000	156.7
Tacoma, WA – 2010 potable	317,450	150.0
Otay, CA – 2010 potable	198,616	149.9
Tucson, AZ – 2010 potable	545,975	144.0
Mountain View, CA – 2010 potable	72,800	132.6
Aurora, CO – 2010 potable	325,078	126.6
Austin, TX – 2010 potable	886,768	121.9
San Diego, CA – 2010 potable	1,312,000	118.2
Santa Barbara, CA – 2010 potable	91,416	115.0
San Antonio, TX – 2010 potable	1,360,000	105.7
Philadelphia, PA – 2010 potable	1,500,000	104.5
Chicago, IL – 2010 potable	5,300,000	98.4
Sacramento, CA – 2010 potable	430,437	91.4
Portland, OR – 2010 potable	915,800	61.0
Sources: Table 6.2-2 Future Water Requirements of the Washington County Water Conservancy District., DeOreo, W.B., P. Mayer, J. Kiefer, and B. Dziegielewski. 2016. Residential End Uses of Water, Version 2. Water Research Foundation. Denver, CO		

Water Efficiency Impacts Not Considered After 2045

The forecast for Washington County in year 2075 would place its water use among the very highest water using communities in the western US today and in the future. With the Lake Powell Pipeline, Washington County must necessarily also have high water rates. A strong price signal through rates is proven effective at reducing consumption, even in communities with second homes and significant volumes of irrigation. Yet the DEIS shows no efficiency improvements or demand reductions in Washington County for a 30-year period.

It is unclear why efficiency improvements are stopped in 2045. This is neither reasonable, nor realistic particularly given the anticipated impacts of climate change

which will drive up the cost of providing water and will reduce supplies. All of the new demand in Washington County will come from new residents and new buildings that will be constructed in compliance with modern plumbing codes and standards. These national codes and standards, such and the 1992 Energy Policy Act require that all toilets sold in the US use 1.6 gallons per flush or less. Stores like Home Depot only offer EPA WaterSense certified toilets use at 1.28 gallons per flush or less. New buildings will necessarily be more water efficient that old buildings. Assuming future water use in 2075 will be the same as it was in 2045 without efficiency improvement is not reasonable and not a sound basis for least-cost infrastructure planning.

Recent failures of demand forecasting (discussed below) have exposed demand forecasting methods that fail to include long term efficiency improvements and thus water efficiency and efficiency improvement are now standard consideration for most demand forecasts. These forecasting failures have been largely due to inflated future per capita demands and inflated population forecasts – two problems clearly evident in the DEIS.

The changes and efficiency improvements that have been made in indoor residential water use are documented in research conducted by the Water Research Foundation and documented by the American Water Works Association. A summary is presented in Table 7. These data shown that modern, water efficiency homes in the US will use about 40 gpcd indoors. In the future they could use even less.

Table 7. Summary of per capita use from Residential End Uses of Water Studies (REUWS) (gallons per capita per day)

Toilet	18.5	14.2	7.7
Clothes Washer	15	9.6	4.4
Faucet	10.9	11.1	8.1
Shower	11.6	11.1	11.0
Dishwasher	1.0	0.7	0.5
Leak	9.5	7.9	5.0
Bath	1.2	1.5	1.5
Other	1.6	2.5	1.6
Indoor Total	**69.3**	**58.6**	**39.8**

Sources: Mayer, P.W., W.B. DeOreo, et. al. 1999. Residential End Uses of Water. American Water Works Association Research Foundation, Denver, CO.; DeOreo, W.B., P. Mayer, J. Kiefer, and B. Dziegielewski. 2016. Residential End Uses of Water, Version 2. Water Research Foundation. Denver, CO; W.B. DeOreo, A. Dieteman, T. Skeel, P. Mayer, et. al. 2001. Retrofit Realities. Journal American Water Works Association, March 2001.

A major emerging trend in water utilities in the use of advanced metering infrastructure (AMI) to detect customer leaks and alert customers about abnormal usage. Recent research has shown that these programs are capable of reducing customer-side leakage by

about 50%.[159] As the cost of water increases over the next 50 years, outdoor use will become more and more expensive and landscaping will be adapted accordingly.

Secondary Water Use Improperly Forecast

Baked into the DEIS demand forecast is a substantial component of secondary water use…secondary water use accounts for about 20% of 2015 demand once water losses are included.

Secondary water is defined as "non-potable or untreated water that does not meet EPA Safe Drinking Water requirements. Generally, irrigation and canal companies deliver secondary water through open ditch systems or pressurized pipelines for irrigation of lawns, gardens, landscape, parks, cemeteries, golf courses, and other open areas."[160]

Because secondary water use is imbedded into the 2015 water demand of 302 gpcd (71 gpcd is secondary water), secondary water demand is necessarily increased throughout the 60-year forecast. In Washington County today, most of the secondary water is supplied by irrigation companies with limited water rights about 8,450 AFY. These supplies cannot possibly grow proportionally with population into the future as shown…yet they have been improperly imbedded into the 2015 baseline demand.

Even with the 20% conservation factor applied through 2045, secondary water use must necessarily increase through the demand forecast and after 2045 because of the forecasting method used. This is not reasonable. The LPP should not be constructed to provide secondary water use for irrigation, rather the project is only properly considered as a potable supply. Use of secondary water is seasonal, thus including it as part of the annual gpcd is misleading from the perspective of supply timing as well.

Secondary water is a separate supply and thus demand for secondary water should be determined distinctly from the potable demand into the future. Lumping them together, as has been done in the DEIS, is improper from multiple planning and forecasting perspectives and should be corrected. WaterDM estimates that including secondary water in the demand forecast has improperly inflated per capita demands in the DEIS by at least 20%.

To correct this problem, the DEIS forecast should separate the irrigation company secondary water use of 8450 acre-feet. If secondary water use is projected to increase in the future it should be capped at a volume commensurate with the available surface water rights that could be used for this purpose.

The DEIS should be corrected and the Bureau of Reclamation must clarify to what extent secondary water of the irrigation companies will not be carried in the projection for the need for Lake Powell Pipeline. The cost of secondary water is generally much lower than for potable water and it is not clear how the economics of the $2 billion Lake Powell Pipeline work if 20% of the supply is sold at secondary water rates not to mention 15.4% of the supply lost to leakage.

159. San Francisco Water Power Sewer, Leak Alert Program", accessed September 5, 2020, at: https://sfwater.org/index.aspx?page=947.
160. 2015 Municipal and Industrial Water Use Data. 2020 version 3, Division of Water Resources, page 5, at: https://water.utah.gov/wp-content/uploads/2020/07/2015WaterDataV3.pdf.

Coalition: The Coalition identified that secondary water use did not grow with the population in our past FERC comments in LPP Scoping Document 2 in 2011.[161]

For example, a review of earlier UDWR water use reports from 1998-2015 reveals that secondary use has not appreciably increased, even though the population has doubled. Table 8, from an analysis by Conserve Southwest Utah, shows estimates of secondary water use in Washington County, population, and source of information.

Table 8. Estimates of secondary water use and population in Washington County, 1998-2015.

Year	Secondary Water Use (AFY)	Population	Reference
1998	Residential 4,510+ Commercial 1593.1+ Institutional 4483= Total 10,587	78,800	Boyle Engineering Corporation, "Water Supply Needs for Washington and Kane Counties & Lake Powell Pipeline Study", 1998. [162]
2005	7,445.5	127,090	Division of Water Resources, "Municipal and Industrial Water Supply and Uses in the Kanab Creek/Virgin River Basin," Table 16, p. 41, Table 17 p. 42 [163]
2010	8504.9		UDWRe "State of Utah Municipal and Industrial water Supply and Study Summary 2010"[164]
2015	Residential 2,750 + Commercial 1,144 + Institutional 8,450 = Total 12,346	151,360	"2015 Municipal and Industrial Water Use Data, 2020 version 3, Utah Division of Water Resources "[165]

The 2015 secondary water data for institutions of 8,450 AFY[166] is provided by irrigation company water shares. This is why it doesn't increase with the population and, therefore, it should be deleted from the GPCD because it inflates the need for the LPP.

The Utah Division Water Resources explained the problem of not having accurate data on secondary water use in 2011 Water Needs Assessment:

> *"4.1.4.2 Secondary Water Supplies* [pages 4-12]
>
> *"A number of irrigation companies deliver secondary water to most of the M&I systems in Washington County. While the 2005 secondary water use data published by DWRe are considered reliable due to the significant validation*

161. "Lake Powell Pipeline Coalition's Comments on Proposed Study Plan and Scoping Document 2", accession no. 20081119-5130 (November 19, 2008), pages 23-26, at: https://conserveswu.org/wp-content/uploads/2012/04/scoping-2-comments-final.pdf.
162. Boyle Engineering Corporation, "Water Supply Needs for Washington and Kane Counties & Lake Powell Pipeline Study", p. 1, 19,21. December 1998, Table 2.2, Table 2.3, at: https://conserveswu.org/wp-content/uploads/2020/07/Boyle-report-Water-Needs-Assessment-1998.pdf.
163. Division of Water Resources, "Municipal and Industrial Water Supply and Uses in the Kanab Creek/Virgin River Basin," Table 16, p. 41, Table 17 p. 42 , at:https://conserveswu.org/wp-content/uploads/2020/07/DWR-secondary-water-supplies-2005.pdf.
164. Utah Department of Water Resources, State of Utah Municipal and Industrial Water Supply and Study Summary 2010, Table 2-24, page 135, at: https://conserveswu.org/wp-content/uploads/2020/07/DWR-MI-water-use-2010.pdf.
165. 2015 Municipal and Industrial Water Use Data. 2020 version 3, Division of Water Resources, page 147, at: https://water.utah.gov/wp-content/uploads/2020/07/2015WaterDataV3.pdf.
166. Ibid.

process followed, reliable data for previous years are not available with enough frequency to assess possible trends in use within the District or on a per capita basis. In 2005, total secondary water use by M&I systems in Washington County was about 7,450 ac-ft (DWRe 2009b)."[167]

The State of Utah's Office of the Legislative Auditor General, completed a Performance Audit of Projections of Utah's Water Needs, May 2015, and pointed out the problem with counting secondary water from irrigation companies statewide. The Auditors report also shows the problem with the state adding on 55 gpcd as a standard for secondary water without justification throughout the state.[168] They wrote: [169]

> *"Volatility in the reported secondary water use raises doubts about the comparability of past water studies. It also raises questions about the accuracy of the report that water use has declined by 18 percent from 2000."*
>
> *"Figure 2.4 [from UDWRe] shows large fluctuations in secondary water use (shown in blue) during 2000, 2005, and 2010. It shows that the secondary water use in 2000 was 55 gpcd. This is the difference between the year 2000's total water use of 293 gpcd and the potable use of 240 gpcd. In 2005, that reported secondary water use rose to 70 gpcd. Then it declined to 55 gpcd in 2010. These swings in the reported use are explained, in part, by the use of different methods to estimate secondary water use."*

The Auditor's report explained its concerns with the accuracy of accounting for secondary water statewide by referring to Figure 10 below (their Figure 2.4).[170]

167. Utah Board of Water Resources, Water Needs Assessment, Draft March 2011, page 4-12, at: https://conserveswu.org/wp-content/uploads/2012/04/19DraftWaterNeedsAssessmentReport-1.pdf
168. "State of Utah Municipal and Industrial Water Supply and Use Study Summary" 2010, page xvi, of the total, 185 is potable and 55 gpcd is non-potable.
169. Office of the Legislative Auditor General, State of Utah A Performance Audit of Projections of Utah's Water Needs, May 2015, Chapter II Reliability of Water Use Data Needs to Improve, page 25 at: https://le.utah.gov/audit/15_01rpt.pdf.
170. Ibid, page 22-23.

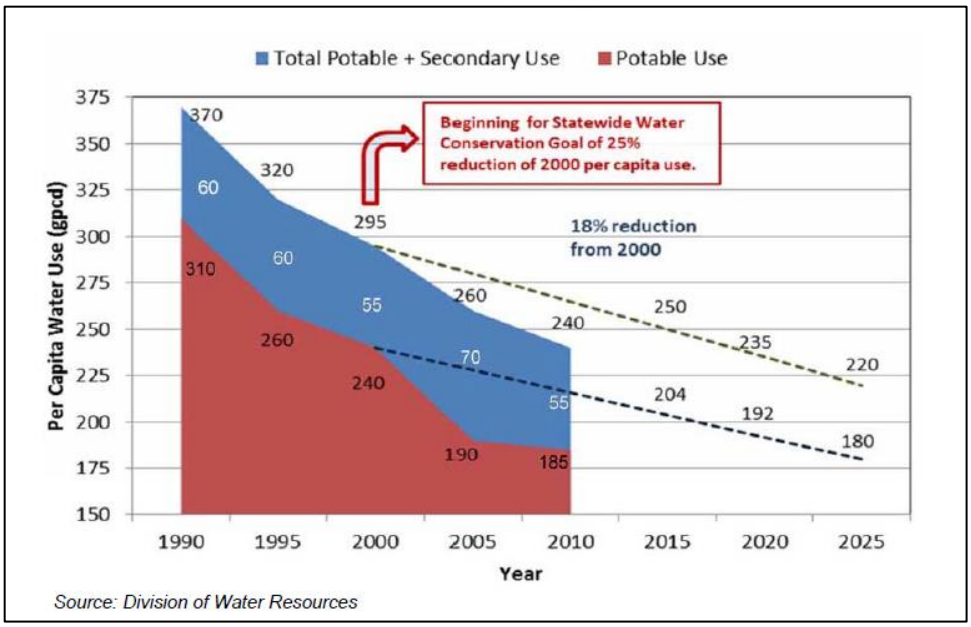


Figure 10. Methods Used for Estimating Secondary Water Add Uncertainty in the Accuracy of Utah's Water Use Projections.

Figure 11 (from their Figure 3-1, Page 3-2[171]) shows how the same 55 gpcd is added to per capita use in Washington County in 2010. The per capita use is explained:

> *"Section 3.2.1 WCWCD 2010 Per Capita Water Use, page 3-2, 2015*
>
> *"In 2010 the per capita water use in the WCWCD service area was estimated to be 325 gpcd. Figure 3-1 above shows that 270 gpcd was culinary water and 55 gpcd was secondary untreated water. Residential use contributed 156 gpcd, and commercial, institutional and industrial (CII) use contributed 169 gpcd. CII includes use from second homes."* [emphasis added]

171. Utah Division Water Resources, Water Needs Assessment, p.3-2, 2016, at https://conserveswu.org/wp-content/uploads/2018/03/FERC-Water-Needs-ASSESSMENT-19-5-5-16-1.pdf

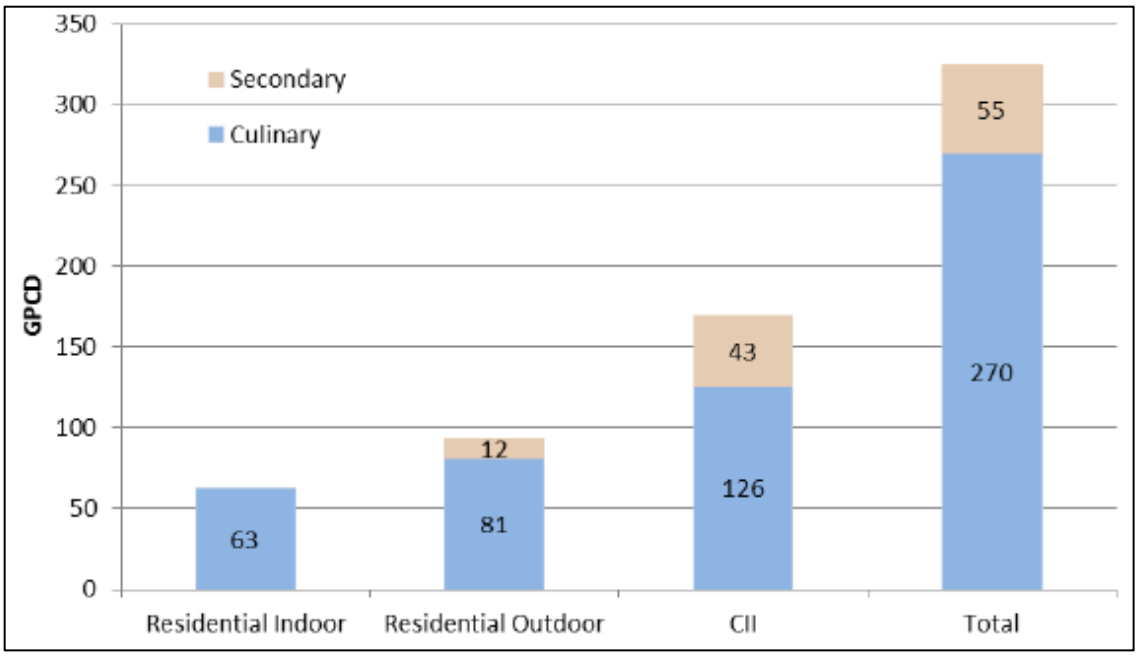


Figure 11. Secondary water added to residential in 2010 (reproduced from UDWRe Figure 3-1.

Cities reported their irrigation company water shares for their secondary use, and that is why the amount of secondary water use was so similar over the years. Weber County found after they simply metered secondary water—without changing any pricing—homes used 30 percent less water.

This information indicates secondary water shares of the irrigation companies do not increase with population growth. Thus, it is not justified to add 73 gpcd of secondary use in per capita use for 50 years, because it distorts the need for water. The secondary use is also seasonal, and not used 365 days a year. Since the institutional water users are using the most secondary water 8,450 AFY and do not pay any property taxes for water, or increase water rates, or added surcharges, this puts more of the cost burden paying for the LPP's water on residents and businesses. Also, irrigation companies would not have any fees to help pay for the LPP, and again the LPP's costs falls more on the residents and businesses to pay for the LPP.

The DEIS is not sufficient because it is using the wrong information by including the irrigation company water shares that improperly inflate the GPCD demand for the LPP.

WaterDM Concurs that Future Per Capita Use Improperly Inflated

Again, from Water DM's analysis:

> If more than 500,000 people live in Washington County Utah in 2075 and use an average of 277 gpcd (including water losses) it will be one of the most water-inefficient communities in America in that year or any year. It is not reasonable to plan for such inefficiency and profligate water use.

The future per capita use presented in the DEIS has been improperly inflated given that 30 years of potential efficiency gains are ignored, secondary water use is incorrectly included and allowed to increase, and water loss is never addressed.

System Loss Forecast

In the DEIS, a 15.4% water loss factor is applied each year to account for real losses in the system. The 15.4% water loss factor, presumably based on current water loss rates, *does not change over the 60-year period of the forecast* and is applied to both potable and secondary water use. **[T]he DEIS predicts real annual water losses (e.g. the physical loss of water from the system) of more than 24,000 AF by year 2075**, which is an astonishingly high volume and more than the potable demands of the commercial and industrial sectors combined.

The Lake Powell Pipeline is $2 billion dollar project and the DEIS forecast states that 15.4% of the product or value delivered through this LPP will be lost each year. This implies that approximately $300 million in value of the $2 billion dollar project will be wasted over the life of the project. This is an outrageous, wasteful, and completely unreasonable assumption to foist upon water rate payers in Utah. The economic consequences of $300 million in water losses are simply too large to ignore. State and national policies are increasing accountability for water loss and requiring utilities to reduce real loss to the extent it is economically reasonable. In 2020, Utah passed HB 40 which will improve water loss accounting across the state.[172] This increased scrutiny of water losses will certainly apply to Washington County as well.

The starting point for water loss in Washington County, 15.4%, is an extremely high level of real losses for a system to endure. For many years an industry rule of thumb was that anything above 10% "unaccounted for water" constituted a real problem. Over the past 20 years water loss accounting has improved and advanced which has improved understanding of typical water loss rates, which vary tremendously depending upon the age of a water system. Properly designed and installed new distribution systems have lower levels of loss than older water systems and managing system pressure has a significant impact.

It is unreasonable that water loss levels for Washington County to do not improve over time in the DEIS forecast. This implies that this high level of waste and loss is both tolerable and acceptable and affordable, none of which is true. More properly, the DEIS forecast should show a decreasing level of water loss over time until a level below 10% is achieved. A level of 6% - 8% would not be an unreasonable target for a well-managed system with many new components based upon my experience. Maintaining a loss level of 15.4% unreasonably and unnecessarily inflates the final demand forecast by at least 5.4% - 9.4%.

172. Utah Legislature, H.B. 40 Water Loss Accounting, 2020 General Session, at: https://le.utah.gov/~2020/bills/static/HB0040.html

Population Forecast

The single most significant aspect driving future demand in the DEIS forecast is anticipated population growth in Washington County. The DEIS population forecast is based on state forecasts developed by the Kem C. Gardner Policy Institute,[173] but extends the Gardener forecasts another 10 years to 2075. This DEIS forecast shows that population of Washington County in 2075 bill be 594,660 people, a 293% increase over 60 years. The Gardner forecasts show Washington County to be the fastest growing county in Utah over the next sixty years. If realized, Washington County will be the most populated stretch of I-15 from Las Vegas to Provo.

The rate of population growth starts at a rip-roaring 3.4% per year and reduces by about 50% finishing the 60-year forecast in 2075 at a still remarkably high growth rate of 1.7% per year. It is interesting to note that the DEIS population forecast extends 10-years beyond the 2017 published Gardner Institute forecasts, adding more than 94,000 people during from 2065 – 2075. It is unclear if this the additional 10-years of population growth was prepared by the Gardener Institute or if it simply extends their forecast.

I have reviewed numerous population forecasts over my 25-year career, but I have seldom encountered a growth forecast as aggressive as the one presented in the Lake Powell Pipeline DEIS. The level of growth projected would create a community the size of Tucson, Arizona, Fresno, California, or Albuquerque, New Mexico in Washington County by 2075. Even spread out across the county, this would represent a tremendous level of growth across what is now a largely rural area. What is the expected economic driver for this exceptional level of growth?

It is rare in the US for an isolated region to experience a 293% growth surge without a corresponding economic driver. For example, Gilbert Arizona, one of the fastest growing communities in the US over the past 30 years saw growth driven by technology companies and large businesses that chose to locate nearby. What will drive a similarly high level of growth to Washington County? Tourism to Zion National Park and other attractions in the region may be part of the answer, but certainly not all so it remains unclear what will drive the 293% growth projected for 65 years in Washington County. It seems likely that the population forecast has also been inflated.

An inflated future population results in an inflated future demand forecast. It seems quite possible that the population forecast presented for Washington County is unrealistic and the future population will more likely be much lower. Data and information supporting a 293% population growth has not been offered to my knowledge. Support for a population forecast with an escalating growth rate has not been offered and the DEIS population forecast extends ten years beyond forecasts published by the Gardner Institute.

Inflated Demand Forecasts, Costly Decisions

The factors that combine to create a greatly inflated demand forecast in the DEIS are not unique. Water utilities have struggled with making accurate demand forecasts since the

173. Utah's Long-Term Demographic and Economic Projections Summary. July 2017. Principal Researchers: Pamela S. Perlich, Mike Hollingshaus, Emily R. Harris, Juliette Tennert & Michael T. Hogue

mid-1980s when federal plumbing codes and energy standards began reducing the water used for toilets, showers, faucets, clothes washers, dishwashers, and more.

An August 2020 report found that California water providers consistently inflated forecasts of future demand even as they tried to incorporate the impacts of efficiency. On average, the report found water suppliers projected that per capita demand would decline by less than one percent per year; actual per capita demand declined twice as fast.[174] The report states:

> *"Urban water suppliers routinely overestimated future water demand, projecting increases in water demand even as actual demand declined. The is largely due to inflated estimates of future per capita demand, although overestimates of population are also a contributing factor." (p.8)*

The consequences of an unrealistic and inflated demand forecast can be significant and can impact a community for years to come. The report states:

> *"Overestimates of future water demands have important implications for local communities and the state. Specifically, they can result in unneeded water supply and treatment infrastructure, higher costs to ratepayers, and unnecessary adverse environmental impacts." (p.8)*

The consequences of the inflated water demand in the DEIS include all of the problems noted by the Pacific Institute – over-sized expensive infrastructure, higher costs to rate payers, and unnecessary environmental impacts. Even if the LPP is constructed and the full population forecast appears, future per capita use is likely to be substantially lower than forecast in the DEIS. An unrealistic population forecast, and unreasonably high levels of water loss compound the problem and further inflate demands to unrealistic levels compared with communities across the western US.

3.2.3 Water Needs, page 4.

> *"The future water need (or supply deficit) in each Participant's service area was calculated by subtracting the estimated water supply in 2060 from the estimated water demand in 2060. Adding the water needs together provided the amount of water needed for the overall Proposed Project. After calculating the future water need, the amount of LPP water allotted to each Project Participant was applied to their respective deficits. This identified the contribution of the Proposed Project to satisfying the water supply deficit and whether a deficit remained or if the Proposed Project would result in a surplus. Vetting this portion of the process was simply a determination that the correct mathematical operations were used."*

Coalition: We describe in our comments that there is not a deficit because the proponents try to increase the need for the LPP. The BOR allowed the proponents to artificially inflate Washington County's need for water to justify the need for the LPP; therefore, the BOR

174. An Assessment of Urban Water Demand Forecasts in California. August 2020. Pacific Institute. Oakland, CA.

decisions were based on the wrong information. The DEIS needs to be updated with the correct information.

The BOR bases its purpose and needs on the proponents' unsupported assumptions, including the introduced an arbitrary 15-year water supply "reserve buffer" requirement that calculated water demand for 2060 but calculated now for a 2075 population. Thus, the BOR has to reconsider this fact in updating the DEIS.

The BOR also does not provide any evidence of proponents projected "system loss" of 15.4 percent annually to the year 2075. The BOR is allowing the proponents to use an arbitrary way to increase demand using the 15-year "reserve buffer" and continuing to use 15.4 percent "system loss" for a total of increases water demand by 30 percent. These factors appear to be the proponents' contrivances to justify the LPP. If these forecasts hold, annual water losses will be more than 24,000 AFY by year 2075, which is more than the potable demands of the commercial and industrial sectors combined. Thus, the DEIS needs to be updated with accurate information. Vetting by the BOR is not evident.

4. Water Supplies, page 5, 4.2.1 Current Operations and Delivery System WCWCD, page 6.

> *"The cities and towns in Washington County have historically developed independent water collection and treatment systems; however, since WCWCD's first project in the mid-1980s, the major municipal water systems have become increasingly integrated. The majority of WCWCD system water is delivered to municipal customers who serve over 85 percent of the population of the county. WCWCD water supply systems include the following major facilities."*

Coalition: The statement that WCWCD serves over 85 percent of the population is not true. According to Karry Rathje, WCWCD Communications Director, WCWCD sells today about 25,000 AFY. If the total amount of use today is estimated about 60,000 AFY the WCWCD does not provide 85 percent of the water supplies.

4.2.2 Virgin River Daily Simulation Model page 8

> *"The VRDSM is a mean daily simulation model of the Virgin River developed by the UDWRe. The model is a FORTRAN-based yield model used to evaluate potential changes in operations on the Virgin River in southwest Utah. The model simulates the river system from the Virgin River at Virgin gage to the Utah-Arizona state line for a 78-year period from 1941 to 2018. The model simulates the Quail Creek project, Sand Hollow Reservoir, pump-back from the Washington Fields diversion to Sand Hollow Reservoir, hydropower plants in operation within the WCWCD and instream flow requirements (UDWRe 1998). The model has the capability to simulate additional regulating storage, an expanded secondary system for the St. George area and the import of Lake Powell reservoir water to Sand Hollow Reservoir by the LPP.5-"*

Coalition: The Virgin River model does not, however, include all the water which the WCWCD diverts to its reservoirs and its aquifer project every year during higher flows in March, April, and May—the reservoirs fill most years. The DEIS notes on page 10, 1.5.2. Virgin River, that:

> *"The Virgin River gage in Virgin, Utah is located upstream from any major diversions. The long-term mean annual streamflow at this gage is 182 CFS. Annual streamflow is usually greater than 100 CFS and in high water years can exceed 300 to 400 CFS."*

This information shows there is lot more water the WCWCD could divert and therefore there is no future shortage. The problem with the assumption in the DEIS that the WCWCD has to get water from the Colorado River is faulty because they could divert more spring runoff to the reservoirs.

The WCWCD creates the impression that it is running out of water by only claiming a small amount of water from the Virgin River surface water diversion of about 30,922 AFY by 2060. For instance, UDWRe lists Quail Lake (wholesaler) as receiving surface water from the Virgin River at 26,922 AFY and Sand Hollow Reservoir (Hurricane Valley retail plus wholesale) as 4,000 AF.[175]

In other reports,[176] they claim a much higher amount of more than 113,000 AFY of water use by 2060. This amount of water would fill the shortage that is claimed by the model.

Another option to fill the shortage not considered in the DEIS can be found in the 2010 Maddaus study[177] that projected a list of conservation programs could save up to 57,000 AFY and only cost $88,000,000.

The DEIS analysis is deficient because it leaves out this information. The Coalition suspects since the WCWCD diverts the seasonal high water, there will be enough water to sell to the cities for future growth. Especially since they only account for such a small amount from their existing reservoirs and aquifer.

Further, in a figure from a UDWRe report,[178] we could not find that Utah has a share in the Lower Basin. However, the chart shows more water of 113,000 AFY because the proponents only claim a smaller amount of water (30,922 AFY) by 2060.

In addition, from a Deseret News article in 1993:

> *"Utah officials asked the U.S. Supreme Court to allocate the river in 1960 as part of the court's ruling in the landmark Arizona vs. California water dispute. The case addressed allocation of Colorado River tributaries in Arizona and Nevada. But the court's special master assigned to the case said there was no (current) fight over the Virgin River, so he didn't allocate it."*[179]

175.. Utah Division of Water Resources, "2015 Municipal and Industrial Water Use Data, 2019" Version 2, at https://water.utah.gov/wp-content/uploads/2019/08/2015-MI-Data-2019-v2.pdf.
176. Utah Division Water Resources, "Utah's Perspective: The Colorado River", page 8, at: https://water.utah.gov/wp-content/uploads/2019/01/TheColoradoRiverart.pdf.
177. Maddaus Water Management Inc, " Overview of Maddaus Resource Management's Water Conservation Technical Analysis Memorandum, at: https://conserveswu.org/wp-content/uploads/2020/05/Maddaus-report-2010-1.pdf.
178. UDWRe, "Utah's Perspective: The Colorado River", page 8, at: https://water.utah.gov/wp-content/uploads/2019/01/TheColoradoRiverart.pdf.
179. Brown, M. "A Rift Runs Through It: War Brewing Over Rights To Virgin River Water", Deseret News, Jun3 17, 1993, at: https://www.deseretnews.com/article/295722/A-RIFT-RUNS-THROUGHT-IT--WAR-BREWING-OVER-RIGHTS-TO-VIRGIN-RIVER--WATER.html.

4.2.3 Current Supply, page 8.

> *"Washington County water supplies come from a combination of groundwater (springs and wells) and surface water (direct diversions and reservoirs; Table 4.2-1). The Navajo Sandstone Aquifer and shallow alluvial aquifers in the Virgin River Basin provide groundwater resources. Surface water sources consist of the Virgin River and its tributaries. Groundwater supplies developed by public drinking water systems are generally of high quality and can be used directly for culinary uses after disinfection. Surface water supplies are used directly to meet secondary untreated water demands or are treated to meet culinary demands."*

Coalition: But the discrepancies in Figure 4 above need to be resolved. Additionally, emphasizing the need for metering secondary water, the Legislative Audit[180] stated:

4.2.4 Local Planned projects, page 9.

> *"Because most of the readily available water in the county has been developed and most of the county is closed by the state engineer to the acquisition of new water rights, the municipalities generally rely upon the WCWCD for future water supplies, most of which will need to be provided through large water projects that require a regional funding base (Table 4.2-2)."*

Coalition: The DEIS Table 4.2.2 shows planned projects to increase future supplies of 13,670 AFY culinary and 17,380 AFY secondary water, for a total of 31,050 AFY. This omits Warner Valley Reservoir, which has been described as storing 40,000 AFY, as well as sources from cities, irrigation companies, and private landowners. Table 4.2.2 also excludes all of the 147 water rights of the WCWCD.

4.2.5. Water Supply without the LPP, page 9.

> *"The total reliable current and planned water supplies from the local Virgin River basin equals 98,727 acre-feet per year, which is the summed total of the current reliable water supply (67,677 acre-feet) and the estimated reliable water supply from future non-LPP projects (31,050 acre-feet)."*

Coalition: We point out in our comments that there is much more water in the county that can be used for future growth. (See text at Table 3 above and Coalition Comments herein page 40.)

5. Water Conservation, 5.1 Participant Water Conservation Practices, 5.1.2. Washington County Water Conservation District, page 10.

> *"The WCWCD and its municipal partners have invested over $60 million in recent conservation efforts. Washington County was the first Utah county to meet the statewide water conservation goal of reducing per capita water use 25 percent by 2025. In August of 1993, facing rapid population growth and a*

180. Office of the Legislative Auditor General, Audit Report No. 2015-01, "A Performance Audit of Projections of Utah's Water Needs," page 37, at: https://olag.utah.gov/olag-doc/15_01rpt.pdf.

limited water supply, WCWCD approved a Water Resource Management, Development, and Protection Plan, which states, "The District shall develop a water conservation plan which promotes public education and information dissemination concerning water conservation; and promotes the adoption of technologies, practices, and devices which will yield improvements in the efficiency and management of water use." That same month, the WCWCD board called on community citizens to form a Water Conservation and Drought Management Committee. Their efforts resulted in the 1996 Water Conservation Plan, the first of its kind in Utah, followed by updates in 2005, 2010, and 2015."

Coalition: WCWCD claims that any project they build is a "water conservation project." These include pipelines and other capital projects that transport water, totaling $60 million to date. However, WCWCD has invested very little in the active practices that change users' behavior, and that would result in significant conservation. The Coalition understands that WCWCD is a wholesaler of water and builds water projects. However, WCWCD must provide leadership for cities and require that their water contracts implement water conservation programs listed in the Maddaus studies (described below).[181]

In the DEIS, BOR lauds Washington County for reducing GPCD by 30 percent since 2000, but then expects it will take until 2045 to achieve only modest further reductions (to 240 GPCD) and expects no improvement after that, which a wrong assumption and lacks any credibility. Vetting by the BOR is not evident.

Water agencies in Washington County have not focused on implementing active water conservation. The gains made in water demand (reduction from ~ 400 GPCD in 2000 to the current ~300 GPCD) can largely be attributed to an over-estimation of past unmetered secondary water over use. Other reasons for a lower GPCD include passive methods such as higher density residential development (reduced lot sizes), resulting in less landscaped area and less outdoor water use), improved plumbing practices (efficient fixtures and appliances), and education.

Water Management Costs vs LPP Costs

The LPP is more expensive than conventional conservation methods and will require an investment upfront. At an *estimated* $1-2 billion development cost, the cost nearly triples when adding interest over the 50-year payback period, even at low-interest rates secured by state bonds. And these costs are likely to be much higher. For example, the planned but recently judicially rejected Snake Valley Pipeline in Nevada began with a cost of approximately $6.4B. A review of the project with interest costs pushed it to $15 billion[182]. If similar economics apply to the LPP, the costs could easily surpass $4-5 billion.

In contrast, water conservation and management costs are well known and incremental, occurring gradually as required, avoiding the need for large capital projects. Implementing a conservation water use rate structure is very inexpensive for the retailer and can reduce demand

181. Maddaus Water Management, Final Draft Technical Memorandum: Water Conservation Technical Analysis, August 30, 2010, at: https://www.wcwcd.org/wp-content/themes/wcwcd/pdf/maddaus-water-management-water-conservation-technical-analysis-report-2010.pdf
182. Southern Nevada Water Authority, "Ability to Finance Report to the Southern Nevada Water Authority", June 2011, at: http://www.riversimulator.org/Resources/Pipelines/LVP/SNWAsAbilityToFinanceExh383HobbsBonowReport.pdf

by almost fifty percent without compromising community attractiveness and quality of life. Indeed, the greatest negative impacts are only to those who are not conservation minded. Even those impacts can be short-term in nature if the users adapt their behavior. Impact fees could be lowered to help offset Localscapes[183] installations for all new development. A portion of impact fees could help those wishing to convert. New developments should be plumbed for outdoor irrigation using secondary or reuse water instead of culinary water for landscaping. (As noted in a previous section, approximately 70 GPCD of culinary water is currently used for outdoor landscaping.)

Less Costly: Effective Conservation Methods

There have been many studies of various methods of water conservation, their costs and yields:

The WCWCD held back the earlier 2010 Maddaus report that showed substantial water conservation potential:

- Analyses in a report contracted by UDWRe, the 2010 Maddaus Study,[184] included a Program C that saved 57,000 AF at a cost of $83,000,000. The 2010 full report[185], on page 33, listed 54,000 AF of saving by 2060.
- Another Maddaus Study in 2018[186] compared all of the earlier Maddaus studies and exposes the 2015 Maddaus Study as flawed because of the projected water use upon which it's based: 317gpcd in 2060 without conservation, more than our current 303 gpcd. Maddaus concluded the best we could achieve with conservation is 282 gpcd.
- Utah Regional Water Conservation Goals.[187] The state estimates in their 2019 regional goals document that our region's conservation water usage goal for 2065 should be 237 GPCD with a demand of 131,202 acre-feet for a population of 500,000. As explained elsewhere in these comments, balancing supply and demand is very achievable without building the LPP. Washington County can do better using less water, as shown in other desert communities.
- A study of *Integrating Water Efficiency into Land Use Planning in West*[188] by WRA has examples of a proper conservation plan, zoning, costs, and other important planning tools.

The most apparent high yield, low-cost methods to reduce water demand that can be implemented incrementally appear to be:

- Significantly tiered water rate structures.

183. Localscapes, at: https://localscapes.com/
184. CSU, notes on Maddaus Water Management Final Technical Memorandum: Water Conservation Technical Analysis, August 30, 2010, at: https://conserveswu.org/maddaus-report-on-cost-of-conservation-2010/.
185. Maddaus Water Management, Final Draft Technical Memorandum: Water Conservation Technical Analysis, August 30, 2010, at: https://www.wcwcd.org/wp-content/themes/wcwcd/pdf/maddaus-water-management-water-conservation-technical-analysis-report-2010.pdf.
186. WCWCD, Water Conservation Programs: A Comparative Evaluation, republication of Maddaus study, 2018, at: https://conserveswu.org/wp-content/uploads/Maddaus-Water-Conservation-Program-Comparison-2018.pdf.
187. UDWRe, Regional Water Conservation Goals Report Final, 2019, at:
188. WRA, "Integrating Water Efficiency Into Land Use Planning in the Interior West: A Guidebook for Local Planners, June 2019, at: https://westernresourceadvocates.org/publications/integrating-water-efficiency-into-land-use-planning/.

- Conservation-minded building codes limiting grass and promoting native desert landscaping.
- Water budgeting.[189]
- Just-in-Time education and help (as new methods are implemented).

5.2 Evaluation of water use rates, page 12.

> *"UDWRe reports M&I water usage rates from around Utah in its yearly M&I Reports (UDWRe 2020c). Total system water use rates in 2015 to 2018 ranged between 301 gpcd and 313 gpcd for Washington County and 264 gpcd and 473 gpcd for the Kanab/Johnson Creeks sub-basin in Kane County (UDWRe 2015, 2016, 2017, 2018; see Table 5.2-1 and Table 5.2-2). Water use in an individual year is dependent on that year's climate and economic activity, among other factors.*
>
> *"In 2019, UDWRe published the Regional Conservation Plan in 2019 that provided conservation goals for each region in Utah (UDWRe 2019b). In that plan, the 2015 baseline water use rate for Washington County was approximately 302 gallons gpcd and approximately 358 gpcd for Kane County. The 2065 conservation goal for Washington County was 236 gpcd. WCWCD's 12 conservation goal of 20 percent by 2060, or 240 gpcd, is in line with the regional goal and is used in this purpose and need report."*

Coalition: Figure 11, reproduced from the 2013 *Local Waters Alternative*[190], shows a comparison of water use in various Southwest communities. Some of the differences in water use have been attributed to differences in demographics and climate, but these differences can be reconciled through a normalization process mentioned earlier. (Of note, a later analysis determined that even Las Vegas was using few GPCD than Washington County; see below.)

189. Conserve Southwest Utah on water budgets, at https://conserveswu.org/water-conservation/.
190. Western Resource Advocates, Local Waters Alternative to the Lake Powell Pipeline Fact Sheet, 2013, at: https://conserveswu.org/wp-content/uploads/2011/11/WRA-Local-Waters-Alternative-LPP-fact-sheet.pdf

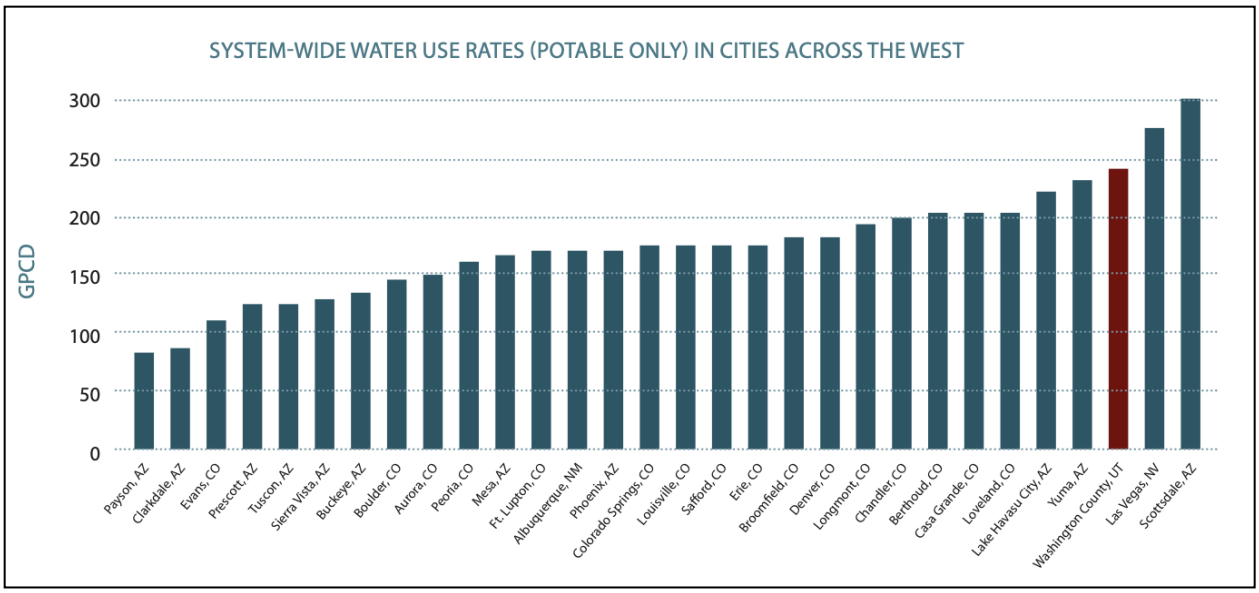


Figure 12. Reproduced from Figure 2 in Western Resource Associates Local Waters Alternative, showing Washington County's GPCD water use in red, nearly the highest of thirty communities they surveyed in the West.

Figure 12, reproduced from comments submitted by the WRA to FERC in a 2018 evaluation of the LPP,[191] illustrates the feasibility of WRA's conservation alternative. It shows that the projected demand (yellow line) fits easily within the supply they calculated. The study, done several years ago in 2013, and using on an older, higher 2060 population projection, is based on a demand of 192 GPCD for a population of 576,850 and requires a water supply of just 115,000-140,000 acre-feet per year (AFY). The *Local Waters Alternative* demonstrates that local supplies could meet the projected demand in 2060 without the LPP. Moreover, current estimates of population growth have dropped to 468,830 in 2060, further extending the reach of our local water supply.

191. Western Resource Advocates, "Comments on the Preliminary Licensing Proposal for the Lake Powell Pipeline, Project No. P-12966-001", November 16, 2018, at: https://conserveswu.org/wp-content/uploads/2020/06/WRA-Locals-Water-Alternative-updated-2018.pdf

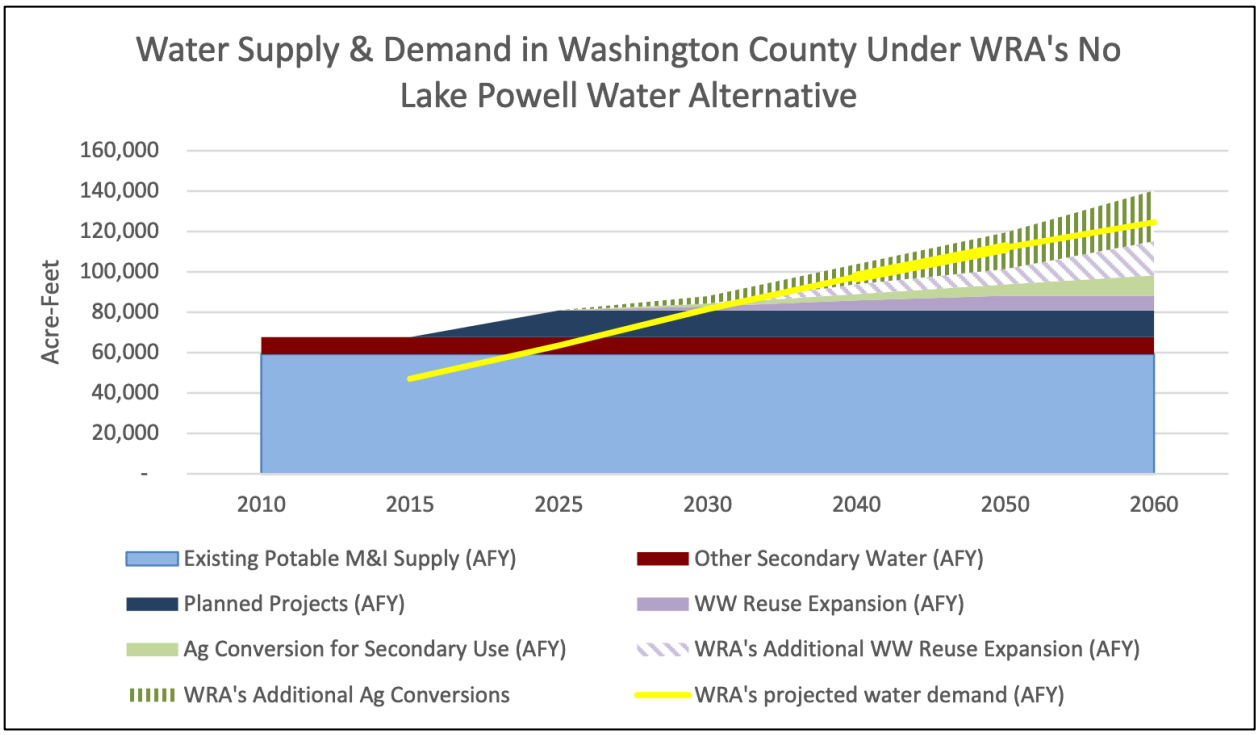


Figure 13.Water Supply and Demand under WRA's No Lake Powell Water Alternative.

6.2.2 Future Water Requirements, page 13.

> *"Estimating total annual water demand in 2060 for Washington County was based on the following generalized equation: Water demand in 2060 must include population projections out to 2075 because the WCWCD incorporates a 15-year reserve buffer. To estimate the population from 2061 to 2075, a constant rate of increase of approximately 1.0174 was applied to the previous year's population projection. This value was used because it was the rate of increase between 2059 and 2060 (the last year before the planning period ends) and because it was the lowest rate of population increase from 2020 to 2060, therefore, representing a conservative estimate."*

Coalition: BOR maintains that it cannot forecast water conservation more than 25 years in the future, so cannot reduce demand after 2045, but then uses assumptions even further into the future to justify the LPP based on a 15-year "reserve buffer" with no justification for why such a buffer is needed in the first place. Further, Figure 13, created from population projection data from the Gardner Institute,[192] shows growth projections as percent increases, which are continuing to decline as 2060 approaches, so, if anything, even lower growth rates should be used.

192. Gardner Policy Institute, "Utah's Long-term Demographic and Economic Projections", July 1, 2017, at: https://gardner.utah.edu/wp-content/uploads/Kem-C.-Gardner-County-Detail-Document.pdf.

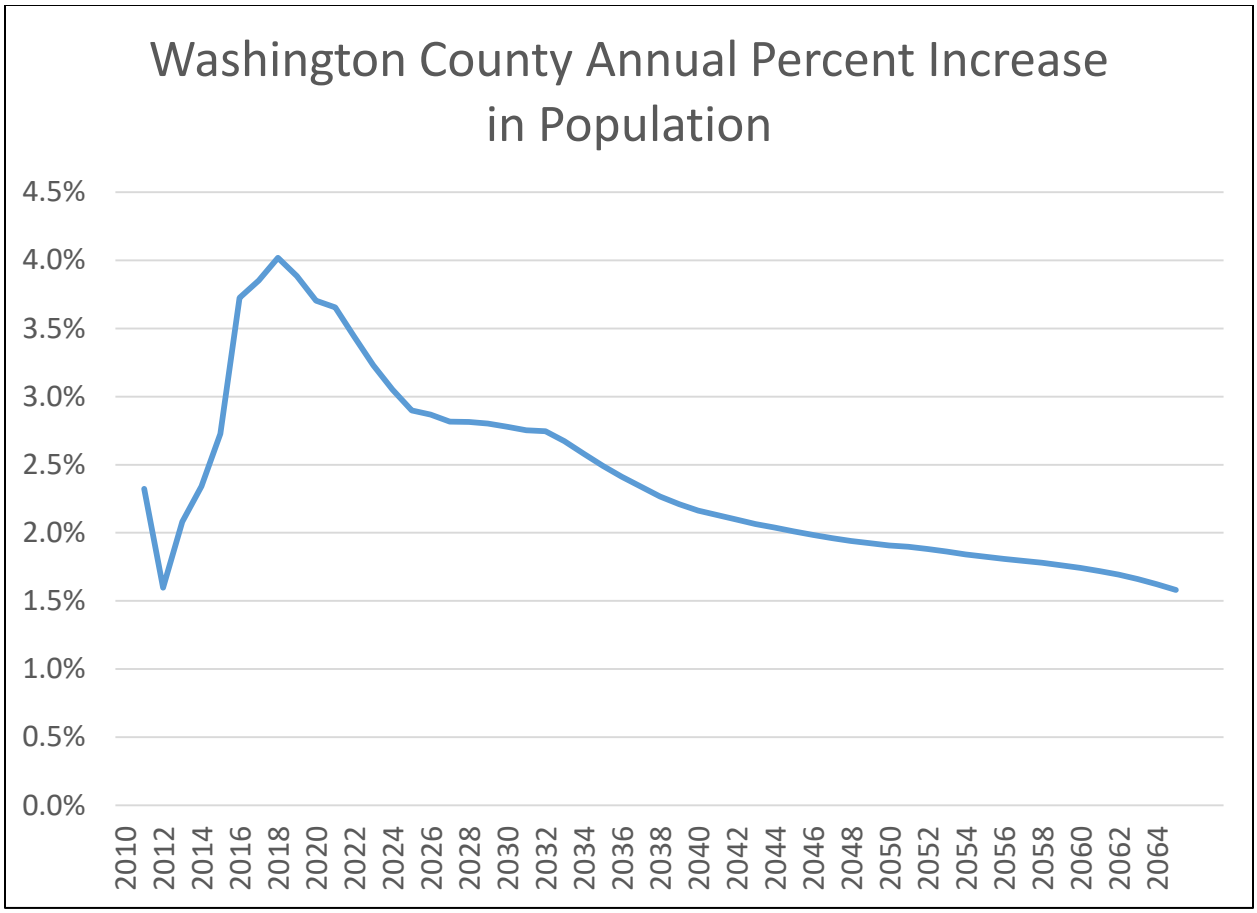


Figure 14. Washington County annual percent increase in population forecast by Gardner Institute.

7. Participant Water Needs, page 14.

> *"Participant water needs were determined by subtracting the estimated water supply in 2060 from the estimated water demand in 2060."*

Coalition: The DEIS is based on a false assumption that population growth requires additional water. Cities in the southwest are finding that is not true. The proponents are trying to inflate the need for water.

Put simply, we are consistently using less water even as populations grow. In almost all municipal areas served with Colorado River water, water use is going down, not up, despite population growth. "*We have been getting it wrong for a century*."[193] Indeed, some cities are still growing rapidly while using less water.[194]

193. Kuhn, E. and J. Fleck, Science be Dammed, How ignoring Inconvenient Science Drained the Colorado River, University of Arizona Press, 2019, p. 215.
194. Fast Company, article April 25, 2011, at: https://www.fastcompany.com/1749643/the-big-thirst-nothings-quite-so-thirsty-as-a-las-vegas-golf-course.

Add to that fact that in 2017 the Kem C. Gardner Policy Institute projected Washington County's 2060 population at 468,830[195], which is 400,000 less than the 860,378 that was predicted in UDWRe's Water Needs Assessment to FERC, just six years earlier. However, to still show the need for the LPP the proponents have to come with some creative ways to show more need by now adding a 15 percent water supple reserve and a 15 percent water system loss for a total of adding 30 percent more water to now 2075.

Of more local interest, according to René Fleming, St. George City Water and Energy Conservation Coordinator, water use in St. George is not growing with population growth:[196]

> *"In 2010, water use reported on the annual reporting the state requires was about 27,000 acre feet. In 2017 it was about 24,000, and population grew from roughly over 70,000 to above 80,000 in the same time period.*
>
> *"Vegetative cover has decreased by about 16 percent. I have a power point slide with an aerial view of a home in 1998 with a lot of grass and a similar sized lot and home in 2018 that is mostly xeriscaped."*

St. George City is using the same amount of water in 2019 as it did in 2010, even though the population had grown from roughly over 70,000 to above 80,000 in the same period. A significant reason is that vegetative cover has decreased by about sixteen percent. Therefore, LPP proponents' claim that the demand for water will grow significantly with population growth needs to be reevaluated in the DEIS because that is not the case. The proponents must be required to provide evidence of their claims.

The UDWRe claims that a water conservation alternative would cost $1.5 billion[197] and would include replacing residential outdoor landscaping with hardened surfaces and offering turf removal rebates, among other measures. The proponents' 2016 Alternative Study Report #22 would cost $3.3 Billion. WRA estimated that implementing water conservation practices would cost about $510 million, about one third of the UDWRe's estimates:[198]

> *"Although the actual costs of the Local Waters Alternative do not include all potential infrastructure needs, those total costs are still likely to be lower, if not significantly lower, than the cost of building the pipeline."*

Another example of growth using less water is Las Vegas.[199]

> *"In the last 20 years, per capita water use in Las Vegas for all purposes has fallen 108 gallons a day, from 348 gallons per person a day to 240 gallons.*

---

195. Gardner Policy Institute, "Utah's Long-term Demographic and Economic Projections", July 1, 2017, at: https://gardner.utah.edu/wp-content/uploads/Kem-C.-Gardner-County-Detail-Document.pdf.
196. Email from René Fleming, Manager Of Energy And Water Customer Services, Water and Power Administration, to Jane Whalen, dated September 24, 2019.
197. UDWRe, Lake Powell Pipeline Project No. P-12966 Water Needs Assessment: Water Use and Conservation Update, Appendix C, 2015, at: https://lpputah.org/wp-content/uploads/2019/01/ATT-C-Water-Needs-Assessment-Update.pdf.
198. Western Resource Advocates, "Local Waters Alternative", 2013, p. 32, at: https://conserveswu.org/wp-content/uploads/2011/11/WRA-Local-Waters-Alternative-LPP-fact-sheet.pdf.
199. Fast Company, article April 25, 2011, at: https://www.fastcompany.com/1749643/the-big-thirst-nothings-quite-so-thirsty-as-a-las-vegas-golf-course.

> *"You don't accomplish that by turning off the water while you brush your teeth (although that helps). You have to fundamentally change people's approach and attitude about water.*
>
> *"In the last 10 years, Las Vegas has grown by 50 percent in population, but the actual use of water hasn't changed at all. The conservation has, in fact, enabled the growth."*

Authors Eric Kuhn, retired General Manager of the Colorado River Water Conservancy District, and John Fleck, director of the University of New Mexico's Water Resources Program, in their book, Science Be Dammed, wrote:[200]

> *"The widespread presumption that population growth means growing water demand drives much of the politics of water planning in the Colorado River Basin. But it is wrong. Simply put, we are consistently using less water. In almost all the municipal areas served with Colorado River water, water use is going down, not up, despite population growth. Water use in the basin's major agricultural regions also is going down, even as agricultural productivity continues to rise. This is not limited to the Colorado River Basin. Such "decoupling" between water use, population, and economies is common across the United States."*

Author John Fleck in an interview with the Public Policy Institute of California[201], responding to a question, "What are the main reasons Californians are using less Colorado River water?", described the Metropolitan Water District of Southern California's (MWD) experience:

> *"Prior to the early 2000s, MWD generally took the maximum it could from the Colorado River, usually more than a million acre-feet per year. In recent decades, it has substantially reduced its dependence on Colorado, only taking a full supply in years of State Water Project shortage. Water conservation has been an enormous success in Southern California. There was a lot of progress in conservation during the latest drought, and even after it ended. We're seeing a lot more effective use of water in the basin, with a growing emphasis on groundwater recharge, stormwater capture, and reuse efforts."*

Instead, a more up-to-date evaluation of water demand resulting from a concerted water management program is needed.

7.2 Washington County Water Conservancy District, 7.2.1 Projected Shortages in Reliable Yield, page 15.

> *"The projected shortage, or deficit, in reliable yield for the WCWCD, was determined by subtracting the 2060 reliable annual water supply from the*

200. Utah Public Radio interview with E. Kuhn and J. Fleck, authors of Science be Dammed, How ignoring Inconvenient Science Drained the Colorado River, 2019, p. 215, at: https://www.upr.org/post/science-be-damned-water-rights-and-scarcity-eric-kuhn-wednesdays-access-utah.
201. Public Policy Institute of California, interview with John Fleck, author of Science be Dammed, How ignoring Inconvenient Science Drained the Colorado River, March 2, 2020, at: https://www.ppic.org/blog/why-the-big-drop-in-californias-colorado-river-water-use/.

2060 demand. Depending on the climate change scenario, the total annual deficit ranged from 112,997 acre-feet to 53,625 acre-feet (see Table 7.2-1). 7.2.2 Lake Powell Pipeline Project Contribution to Reliable Yield The Proposed Project would directly contribute up to 86,249 acre-feet of water to the WCWCD service area, with 73,000 acre-feet delivered to Sand Hollow Reservoir and 13,249 acre-feet to Apple Valley. With potential reuse of LPP water, WCWCD estimates up to approximately 28,830 acre-feet would be available to meet secondary demands. This reuse supply would not be available without the Proposed Project. Assuming reuse of all 28,830 acre-feet of LPP water, the LPP would increase the reliable water supply of WCWCD by 115,079 acre-feet."

7.2.3 Conclusion, page 16.

"Under warmer, wetter climate change scenarios, the LPP would deliver a surplus of water to the WCWCD's service area. However, these scenarios are unlikely according to recent scientific literature regarding climate change in the Colorado River basin (Udall and Overpeck 2017; Milly and Dunne 2020). Under the median or hotter, drier climate scenarios and without LPP reuse, the WCWCD service area would experience a surplus of 463 acre-feet or a deficit ranging from 10,243 acre-feet to 26,748 acre-feet. This should not be interpreted to mean that shortages to residents would be guaranteed, but rather that the 15-year reserve buffer would not be available in the majority of years (50th percentile and hotter, drier years). With reuse of all 28,830 acre-feet of LPP water, the WCWCD service area would experience a small deficit (2,082 acre-feet) or a large surplus (61,454 acre-feet) depending on the climate change scenario. However, without the Proposed Project, there would not be an opportunity for reuse of LPP water, therefore, the potential for a surplus is dependent on the Proposed Project being built. In sum, the LPP would supply water to the WCWCD service area that would reduce the water deficits in some scenarios (hotter, drier climate scenarios) and could provide a surplus of water in other scenarios. Reclamation has concluded, utilizing the professional expertise and judgement of the agency's study team, that the results derived from this report for WCWCD are reasonable and accurate, given the information, data, and methods available at this time."

Coalition: The proponents make the wrong assumption that the Colorado River provides a reliable second source of water. We disclose in our comments that the water District could fill the deficit without spending billions of dollars to build a pipeline to an unreliable source. The proponents thus far have ignored other solutions that we have outlined in our comments here as well as in previous comments.

DEIS Affected Environment and Environmental Consequences

3.10 Aquatic Invasive Species, page 135.

Coalition: The DEIS is not sufficient for these reasons:

1. It did not do an adequate analysis of a possible quagga mussel infestation that could threaten the pipeline, local reservoirs, municipal infrastructure, businesses, and homes, and reduce our water quality.
2. It fails to adequately address the potential cost to eradicate quagga mussels in systems operated by either WCWCD or municipalities or in individual homes and businesses.
3. It failed to analyze the effect and cost of chemicals used to eradicate quagga mussels and the potential impact on the quality and safety of drinking water.
4. It did not address the threat that treating quagga mussels with chemicals poses to drinking water quality. If the treatment uses chlorine, it may create trihalomethanes (THM's) when chlorine reacts with organic matter in the water, which may be toxic to human health and impair our drinking water quality.
5. BOR did not analyze the effects on water quality from quagga mussel waste products (e.g., sulfites, sulfates, nitrogen, ammonia, etc.) and decomposition within the pipeline and their ability to spread toxic algae.
6. The UDWRe's "November 2015 Draft Study Report 2 Aquatic Resources" noted, "[Quagga mussels] have demonstrated the potential to both damage ecosystems and to require significant and costly, but often fruitless, investment to manage and control their effects on structures and equipment in the water supply industry."
7. In 2016, the National Park Service (NPS) expressed concerns to the Utah Department of Water Resources (UDWRe) about transferring water from Lake Powell to Sand Hollow. Utah Water Development Commission members also voiced concerns about the spread of quagga mussels to municipal and industrial water systems.

It is alarming to note that the proponents' March 2011 Draft Study Report 2 Aquatic Resources[202] to FERC devoted about 10 pages to the quagga mussel issue. A few years later, the November 2015 Draft Study Report 2 Special Status Aquatic Species and Habitats[203] devoted only one paragraph to the quagga mussel situation. Then the issue became more critical, judging by the April 2016 Final Study Report Aquatic Resources, which devoted extensive coverage to the subject[204], dedicating nearly a third of the 107-page document to the quagga mussel problem and efforts to control them. Since the LPP efforts began this has become a much more serious problem than indicated in the DEIS.

---

202. Utah Board of Water Resources, "Draft Study Report 2Special Status Aquatic Species and Habitats", March 2011, at: http://www.riversimulator.org/Resources/Purveyors/LPPipeline/11DraftSpecialStatusAquaticSpeciesHabitatsReport.pdf.
203. Utah Board of Water Resources, " 2015 Draft Study Report 2 Aquatic Resources, at: https://www.dropbox.com/sh/76boj1xgew4a3l3/AAA5mYkdZfixwfiTl39TMggRa/Study%20Reports?dl=0&preview=02+Revised+Draft+Aquatic+Resources+Study+Report+113015.pdf&subfolder_nav_tracking=1.
204. Utah Board of Water Resources, April 2016 Final Study Report 2 Aquatic Resources, at: https://conserveswu.org/wp-content/uploads/2020/06/20160430-02-Aquatic-Resources-Study-Report_FINAL.pdf.

3.20.1.4 Water Supply Reliability Benefits page 240.

> *"Water supply reliability benefits are an important consideration in an evaluation of the water supply benefits of the LPP. Additional supplies provided by the LPP will reduce potential gaps in supply and demand in the future as well as decreasing the potential for shortage events at any particular time. Water reliability benefits in the WCWCD are estimated using previously completed studies of water supply reliability benefits. Use of previously estimated benefit values as a basis for estimating benefits is an application of benefits transfer. Several studies have been completed in several states that have estimated water reliability benefits and the benefits of avoiding water supply shortages. The household benefits from avoiding a shortage, or increasing water supply reliability, are estimated to range from about $89 to $360 per household per year, with a best estimate of $300 per household per year. Water reliability benefits to commercial establishments were estimated to range from $360 to $1,800 per establishment per year, with a best estimate of $1,800."*

Coalition: We point out in our comments that the project is not a reliable second source of water therefore, it can't be the only alternative the proponents use for their socioeconomic analysis. The DEIS fails to do a standard socioeconomic analysis and cannot be used as it is.

While the proponents' assumed No Action Alternative provides less security, it's important that BOR address the security, or lack of security, in thinking there will be water available from the Colorado River for the LPP when many experts are now warning about reductions in flow resulting from climate change. If Washington County continues to ignore the need to develop in water-conserving ways, it will find it hard to reverse course when it becomes clear that the LPP will not provide water.

BOR fails to provide a justification for choosing reliability benefits "best" values at the high end of the residential range ($300 from a range of $89-360) and the very highest value in the commercial range ($1,800 from a range of $360-1,800).

3.20.1.6 Ability to Pay and Affordability, page 242.

> *"The estimated ATP for the WCWCD study area based on the Kem C. Gardner projections indicates ATP is sufficient to cover all water service costs, including pipeline alternative costs, through 2070. Under the 2 percent growth scenario ATP is sufficient to cover all water service costs until 2067 and under the 1.5 percent growth scenario ATP is sufficient to cover costs until 2045. Under the 1 percent annual growth scenario ATP would not be sufficient to cover costs by 2039. Under a no growth scenario ATP would not be sufficient to cover all costs after 2032 if a pipeline project were built.*
>
> *"Future ATP to cover costs is dependent on continued growth in the region and that the cost of service assumptions for the future actually occur. If the cost of service (including water charges, fees, and property taxes) increases at a rate that is higher than expected, then this will have an adverse effect on affordability. In addition, two communities in the study area (La Verkin and St.*

George) were considered to be in the economic hardship category as indicated by poverty percentage and some households in these communities could be more affected by rate increases in the region than other communities."

Coalition: It is unwise to saddle a community with debt service that requires a 2 percent growth rate, **especially when the growth rates forecast for the county by the Gardiner Institute are less than 2 percent after 2045, and the escalating high cost and the increasing price of water will reduce revenue to pay for the LPP**.

3.20.1.7 Regional Economic Impacts, page 244.

"The regional economic effects from each project proposal are analyzed using the IMPLAN (Economic Impact Analysis for Planning) model and estimated construction and OM&R expenditures within the study region. The regional effects associated with each alternative are measured in terms of changes in employment, labor income, value added, and value of output. Industry output is a measure of the value of industry's total production and is comparable to Gross Regional Product."

"The comparison of effects for each alternative indicate the Southern and Highway Alternatives would result in a positive regional effect, with substantially more employment and value added than the No Action Alternative. However, overall these one-time effects amount to less than 1 percent of total annual gross regional product for each respective region."

Coalition: See comments above on 3.20.1.4 Water Supply Reliability Benefits. We find it interesting that the price elasticity of demand was analyzed for the No Action Alternative but not for a LPP alternative that requires substantial increases in water rates, impact fees, and property taxes. It contradicts the DEIS conclusion that water use at 240 GPCD will stay the same from the year 2045 to the year 2075, when the price of water is forecast to increase by more than 350 percent.

4. Irreversible and Irretrievable Commitment of Resources of the Proposed Action, page 255.

"NEPA requires the evaluation of irreversible and irretrievable commitment of resources (40 CFR §1502.16). However, these "resources" have not been defined in the regulations. Reclamation has interpreted them in the following manner (Reclamation 2012):

"• Irreversible commitment of resources occurs as a result of the use or destruction of a specific resource (e.g., minerals extraction, destruction of cultural resources) that cannot be replaced or, at a minimum, restored over a long period of time and possibly at great expense.

"• Irretrievable commitment of resources refers to actions resulting in the loss of production or use of natural resources. It represents opportunities foregone for the period of time that a resource cannot be used (e.g., land conversion to new uses, construction of levees preventing the natural flooding of floodplains)."

Coalition: We describe the *Irretrievable commitment of resources refers to actions resulting in the loss of production or use of natural resources* in our comments on the DEIS above. The DEIS hydrology analysis was not based on sound science and sound assumptions.[205] The hydrological modeling in the DEIS did not consider the impact of climate change on water availability from the Colorado River, on the Flaming Gorge Reservoir, on plants, animals and on the LPP. The DEIS did not consider the effect to all resources from the permanent land conversion from all the infrastructure that has to be built to support the LPP.

5. Cumulative Effects, 5.2 Methodology, page 257.

> *"This cumulative effects analysis generally follows the methodology set forth in relevant CEQ, EPA and Reclamation guidance (White House CEQ 1997, 2005; EPA 1999; Reclamation 2012). Under these guidance documents, inclusion of projects within this analysis is based on identifying commonalities of effects from other projects to potential effects that would result from the Proposed Project. Cumulative effects are based on net effects (i.e., effects remaining after mitigation has been applied). If the Proposed Project would not affect a resource, there also would be no potential for cumulative effects on that resource. In general, the overlapping effects from past and present actions are taken into account as part of the baseline conditions described in the Affected Environment section for each resource area analyzed in this DEIS.*
>
> *"The approach taken for this cumulative effects analysis is consistent with the intent of CEQ Regulations for Implementing NEPA at 40 CFR 1502.22, Incomplete or Unavailable Information. This regulation directs agencies on how to proceed when evaluating reasonably foreseeable significant adverse effects on the human environment in an EIS, and there is incomplete or unavailable information. While information describing the characteristics and potential effects of other projects and activities within the temporal and spatial boundaries used in this analysis is primarily qualitative, and, in some cases is incomplete or unavailable, there still is sufficient information to complete a fair disclosure and hard look at potential cumulative effects attributable to the Proposed Project.*
>
> *"For each resource that would be affected by the Proposed Project, this cumulative effects analysis includes the following steps:*
>
> *"• Any relevant interrelated effects from other past, present, and reasonably foreseeable future actions considered in this analysis are discussed; and*
>
> *"• The total combined cumulative effects of the Proposed Project and the effects from relevant past, present, and reasonably foreseeable future actions are discussed."*

205. Harding, B., Memorandum prepared for Conserve Southwest Utah: "Lake Powell Pipeline, Draft Environmental Impact Statement", Lynker Technologies, LLC, pages 1-18 July 28, 2020 (Appendix C).

Coalition: We described in our comments herein that the BOR ignored their existing studies and many other scientific reports on climate change, reducing water availability from the Colorado River for the LPP. Therefore, the DEIS conclusions on *reasonably foreseeable future actions considered in this analysis* are wrong. Thus, the DEIS violates 40 CFR § 1500.1(b) NEPA's purpose to ensure that environmental information is available to decision makers *before* decisions are made; it emphasizes that "accurate scientific analysis" is "essential."

5.2.1.1 Geographic Scope of Analysis, page 258.

> *"The geographic scope of the cumulative effects analysis defines the physical limits or boundaries of the Proposed Project's effect on various resources, with the understanding that if the Proposed Project has no direct or indirect effect on a resource beyond a certain location, then there cannot be any overlapping effect from other actions that may lie beyond that point. Because the Proposed Project would affect various resources differently, the geographic scope for each resource analyzed in this DEIS varies. In general, the boundaries for the cumulative effects analysis for a specific resource are the same as those described in the Affected Environment section for each resource."*

Coalition: As described herein, the DEIS failed to consider that the geographic scope of the water exchange contract is from the Flaming Gorge Reservoir. The analysis of the equal exchange of water at Flaming Gorge Reservoir and the upper reaches of Green River is missing. The DEIS also failed to consider the emergency actions needed to generate more hydropower because our temperatures are rising, which could release large amounts of water from the Flaming Gorge Reservoir. This would leave less water that could be sold in a BOR service contract because the obligation to the Lower Basin has priority over the LPP water right. These emergency releases could adversely affect the habitat of the Green River endangered fishes. The emergency power generation releases will take priority over summer base flow experimental releases.
The BOR's email describes an emergency release of water from Flaming Gorge Reservoir:

> *"Flaming Gorge Notification – 9/4/2020 – Potential Reserve Power Emergency Releases*
>
> *"Greetings,*
>
> *"Similar to the August 17th notification, the Western Area Power Administration has alerted Reclamation to an increased possibility that Flaming Gorge Dam's power plant will need to augment power supplies in the event of a potential power system emergency. As temperatures across the Southwest US remain high and/or increase over the next week or so, the potential for this need increases. This may impact releases over the Memorial Day weekend and longer. These reserves are generally held at Glen Canyon, but are being moved to Flaming Gorge to allow Reclamation to assist with emergency operations to the greatest extent possible. Hydropower is unique in its ability to respond almost immediately to changes in energy demand, and fluctuating water releases to meet that demand are common.*

"Flaming Gorge Dam operations remain flexible, as described in the 2006 Environmental Impact Statement (EIS) Action Alternative for Flaming Gorge Dam, to adjust for power system emergencies when existing power generation resources cannot meet electricity demands. Increased releases might be very short, one or two hours, or could last longer. The largest difference experienced on the river in terms of stage change could occur in the evening when normal releases are at 2050 cfs, but could increase to 3300 cfs or 1-1.5 feet in stage change at the Greendale and Jensen stream gages. Emergency power generation releases will take priority over summer base flow experimental releases.

"The Bureau of Reclamation urges those recreating on or along the Green River below Flaming Gorge to exercise increased caution as possible sudden fluctuations in water releases to meet summer energy demands may cause rapid changes to the river's flow. The Bureau of Reclamation advises those recreating along the river—including river runners, anglers, campers and hikers—to be vigilant and exercise increased caution through the summer months. Unscheduled water release changes may occur without notice. Vessels should be secured to withstand potential changes in water levels and campers should avoid setting camp where a sudden river rise could reach tents or other camping supplies."

"Dale Hamilton, P.E.
Manager, Resource Management Division
Provo Area Office, Bureau of Reclamation
Upper Colorado Basin, Interior Region 7
dthamilton@usbr.gov
p. 801-379-1186
c. 801-616-1593"

5.3 Past, Present, and Reasonably Foreseeable Future Actions, page 258.

"Past, present, and reasonably foreseeable actions were identified using the geographic and temporal boundaries described above that could contribute to cumulative effects from construction and operation of the Proposed Project. Past and present actions identified are those that would likely have overlapping effects with the Proposed Project. [Reasonably Foreseeable Future Actions] RFFAs are future actions where there is a reasonable expectation that the action could occur, such as a proposed action already under environmental analysis; a project where environmental analysis has already been completed, but construction/implementation has not yet begun; a project that has already started construction; or a future action stated in a report, such as a planning document and/or that has obligated funding. These other actions were identified in consultation with local, state, and government agencies in the Project Area, and are listed and described in Section 2 of Appendix C-25, Cumulative Effects."

Coalition: In our comments herein and in the Coalition's Appendix C[206], we describe how the DEIS analysis failed to consider that the Upper Basin states will develop their compact water rights therefore that is reasonable assumption that is missing.

NEPA requires an analysis of connected federal actions. Therefore, the DEIS must include an analysis of the two BOR service contracts that Utah Board of Water Resources (UBWR) is requesting[207], including all the projects that are already using the Green River tributaries spring high-water runoff.

The State of Utah asserts, without evidence, that it will not develop unperfected seasonal high-water Green River tributary flows and, instead, leave them in the Green River for the endangered fishes as long as the State of Utah can withdraw this same amount of water out of FGR reservoir for development.

As background, the Water Exchange Contract reads (page 5):

> *"6. Exchange of Water*
>
> *"For this exchange, the Board will forbear the depletion of a portion of the Green River and tributary flows to which it is entitled and instead allow that portion of the Compact Entitlement Water rights to contribute to meeting ESA Recovery Program Requirements in Reaches 1 and 2."*[208]

However, the Coalition suspects the State of Utah doesn't have any extra unused runoff water rights that it can *forbear* in exchange for water out of Flaming Gorge Reservoir for the LPP.

The two service contracts for the of 1995 Water Right No. 41-3479 include:

- A BOR 50-year renewable service Contract for Utah to draw out 72,641 AFY depletion from Flaming Gorge Reservoir to use for development along the Green River, known as the Green River Block (GRB). (a portion of Water Right No. 41-3479).
- A BOR 50-year renewable service Contract to develop the LPP that would draw 86,249 AFY depletion from Flaming Gorge Reservoir, let the water flow downstream about 400 miles to Lake Powell, and then withdraw water for the LPP from Lake Powell. (the remaining portion of Water Right No. 41-3479).

This water right was supposed to be for the UTE unit of the CUP. But, the BOR decided to assign these water rights to the State of Utah in 1996 instead. These water rights have to show proof of beneficial use by October 2020. Since this is a water exchange contract, the BOR must evaluate if the water will be available for 50 years for the endangered Green River fishes.

The Coalition is concerned that there is not enough water in Flaming Gorge Reservoir for Water Right No. 41-3479 of 447,000 AF AFY diversion. The DEIS should analyze how much water the BOR can sell out of Flaming Gorge Reservoir and still meet its obligation to provide water to the

---

206. Harding, B., Memorandum prepared for Conserve Southwest Utah: "Lake Powell Pipeline, Draft Environmental Impact Statement", Lynker Technologies, LLC, pages 1-18 July 28, 2020, Appendix C.
207. 43 CFR § 1508.25 Scope. Scope consists of the range of actions, alternatives, and impacts to be considered in an environmental impact statement.
208. BOR, Contract No. 17-WC-40-656 "Contract for exchange of water, Lake Powell Pipeline, Between the United States of America and the State of Utah", page 5, Draft, at https://conserveswu.org/wp-content/uploads/LPP-Flaming-Gorge-Contract-CONTRACT.LPPexchange.unsigned.pdf

Lower Basin states. We question that there is enough water for these Contracts due to increasing temperatures, shortages that are already occurring, the over-allocation, fewer winter storms, reduced snowpack and stream flows, and less flow into storage to meet the 1922 Compact allocations. Further, BOR uses an outdated hydrological model that uses the high 100-year average of 15 MAFY at Lee Ferry to determine how much water can be sold out of Flaming Gorge Reservoir. The proponents determined they have physical water remaining by using this high annual flow, but the river flows have been much less and are predicted to decrease further.

The DEIS is not sufficient for the following reasons:

- It lacks any information on what Green River Tributary flows the proponents would forbear for water out of Flaming Gorge Reservoir.
- It doesn't account for the impact of two service contracts withdrawing water from the Flaming Gorge Reservoir.
- It doesn't consider climate change affecting the available water out of Flaming Gorge Reservoir for the LPP.
- It doesn't account for the federal projects that are using the high spring runoff. The CRSP, the CUP, and these two BOR's service contracts as well all the senior water rights holders to the LPP.
- It did not analyze the effect these projects will cumulatively have on endangered fishes and the natural resources of the Green River tributaries.

5. Cumulative Effects page 257, 5.5.7 Hydrology page 263.

> *"DEIS Vol 2, app A, B, C*
>
> *"Appendix C-10 Hydrology, page 31.*
>
> *"The results from these hydrologic model runs should be interpreted with consideration to the model assumptions. Unique to the analysis this analysis is the model assumption that no new projects or depletions would occur in the Upper Basin. This model assumption adopts a rigorous definition of what reasonably foreseeable future depletions are in the Upper Basin and is consistent with Reclamation's National Environmental Policy Act of 1969 guidelines. Under this approach, a reasonably foreseeable future depletion is one which has state legislation, or a tribal resolution or federal Indian water settlement, or a federal FONSI or ROD. These are the criteria of certainty that a future depletion would occur at a particular time and place. This is a conservative approach to modeling the alternatives and takes the strictest approach to defining what is included and excluded for the cumulative effects analysis required by the Council on Environmental Quality's regulations 40 Code of Federal Regulations 1508.7. The cumulative effect is the effect on the environment that results from the incremental effect of the pipeline when added to other past, present, and reasonably foreseeable future pipelines regardless of what agency or person undertakes such pipelines. Cumulative effects can*

result from individually minor but collectively significant pipelines taking place over a period of time.

"It is recognized that the Upper Basin States plan to develop their compact allocated Colorado River water and, as such, it is highly unlikely that depletions would remain at the 2020 level in the future. It should also be noted that the modeling effect of holding most Upper Basin depletions constant at 2020 levels results in depletions significantly lower than the future long-term depletion projections provided by the Upper Basin States, which assume that Upper Basin depletions would grow through 2060. Lower depletions, in turn, result in Lake Powell's elevation increasing throughout the model run. Higher elevations at Lake Powell result in more frequent and higher magnitude equalization and spill avoidance releases in both the Pipeline and No Action Alternatives."

Coalition: The DEIS is not sufficient because it did not analyze the cumulative effects of the proposed Pipeline on water supplies throughout the Colorado River basin. Specifically, the DEIS should have included a detailed analysis of potential cumulative impacts due to other water development projects currently planned, including (but not limited to) projects in the Upper Basin.

As noted above, in the event of long-term reduced system storage, Upper Basin water users may be called upon to curtail water use in satisfaction of the Compact. The Upper Basin states do not yet have formal operating procedures to implement curtailment in the event of a Compact call. Still, the DEIS should develop a series of likely scenarios that project curtailment requirements in each of the states of the Upper Basin. Within Utah, the DEIS must further assess the impacts of the proposed project and curtailment requirements on other in-state Colorado River water users. Because the proposed pipeline is expected to supply municipal and industrial water uses, the DEIS must not only consider the probability of shortages to the pipeline's water users but secondary impacts, such as how water supply agencies would replace the pipeline supplies in the event of a shortage. Precedent for this approach is found in BOR's *Final EIS for Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead.*[209].

The DEIS failed to analyze the impact of the proposed project on river flows throughout the Colorado River basin, particularly in those reaches vulnerable to days of "zero flow" and those reaches for which environmental flows have been defined. Specifically, the DEIS should assess the impact of the proposed project on the magnitude and frequency of flows to the limitrophe reach of the Colorado River in Southern Arizona (where the river channel is the legal border between the United States and Mexico). In addition, the DEIS should have assessed the impact of the proposed project on instream flows (including mean flows) in the Upper Basin, where such flows have been legally established for the protection of natural and recreational resources. The analysis should have also included all areas potentially impacted by shortage conditions in the Upper and Lower Colorado River basin. To the degree that the proposed project increases the probability of Lower Basin shortage conditions, impacts including economic losses and shortage

209. BOR, "Final EIS for Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead", November 2007, available at http://www.usbr.gov/lc/region/programs/strategies/FEIS/index.html (Colorado Basin Shortage EIS), See id., §§ 4.14.2 and 4.14.3.1.

water replacement (including economic costs such as employment, income, and tax revenue, as well as environmental impacts) should be assessed.

The DEIS should analyze all of the CRSP projects and other current and planned projects that will have a direct, an indirect, or a cumulative effect on Colorado River water use in the region. The list below is from Save the Colorado's web page.[210] Projects that should be included in the cumulative impacts analysis in the DEIS include:

In Colorado:

- Moffat Collection System Project in Colorado (15,000 AF, permitted).
- Windy Gap Firming Project in Colorado (30,000 AF permitted).
- Wolf Creek Reservoir on the White River in Colorado.
- San Juan Headwaters Project.
- Irresponsible water use from the Animas-La Plata Project.
- Eagle River MOU (30,000 AF).
- Six proposed new dams on the Fryingpan River in the Holy Cross Wilderness. (6,000 plus AF).
- The "Cow Creek Pipeline" in Ouray County.
- A proposed new dam on the Crystal River.

In New Mexico:

- Gila River Diversion in New Mexico (12,000 AF).
- Navajo-Gallop Water Project (36,000 AF).
- The "Babbitt Diversion" from the San Juan River.

In Utah:

- Price River Dam.
- Green River Block Water Rights Exchange (up to 70,000 acre feet).
- Navajo Utah Water Settlement Act, 81,500 AF.
- Green River Oil Shale (10,000 AFY)
- The Green River/Wasatch Front Diversion

In Wyoming:

- Fontenelle Dam expansion on the Green River in Wyoming (~125,000 acre).
- The 280-foot-high dam on the West Fork of Battle Creek in Carbon County, a tributary to the Yampa.

210. Save the Colorado, "Fighting Irresponsible Water Projects", at http://savethecolorado.org/campaigns/fighting-irresponsible-water-projects/.

- Big Sandy Reservoir Enlargement on the Big Sandy River, a tributary to the Green River. (2,435 AF).

In Arizona:

- The Navajo Pumped Hydropower Project.

We have described in our comments herein and in Appendix C that it was not reasonable that the BOR's analysis kept the levels of depletions at 2020 levels and called that reasonably foreseeable effects of the 50-yr water service contract for the LPP.

The DEIS is not sufficient for the following reasons:

1. It holds depletions to today's levels. The BOR ignores a reasonably foreseeable future that other Upper Basin states will develop their water rights.
2. The BOR's water exchange contract that will be approved by this DEIS is a 50-year renewal water exchange contract therefore the modeling holding the depletions to today's level is not appropriate or reasonable.
3. It doesn't analyze the future conditions of less physical water to meet the 1922 compact allocations.
4. The 2007 *Interim Guidelines'* EIS did not consider climate change impacts and used the flawed 100-year average for flows at Lee Ferry which no longer exist.
5. It violated NEPA 40 CFR §1508.7 which requires analysis of cumulative impacts because it uses a short period. "Cumulative impact" is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.
6. It violates NEPA 40 CFR §1508.8 Effects because it isn't reasonable to not consider climate change-reducing future flows of the Colorado River and related ecosystems. From the CFR:

> *"Effects" include: (a) Direct effects, which are caused by the action and occur at the same time and place. (b) Indirect effects, which are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. Effects and impacts as used in these regulations are synonymous. Effects includes ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effect will be beneficial."*

The Coalition's Appendix C (Lynker Memo) reads: [211]

> *"The DEIS hydrology analyses are not based on sound science and sound assumptions.*
>
> *"The DEIS reports results of hydrology modeling on the Colorado River. Two hydrology scenarios are used to generate this result, a historical scenario and a climate change scenario. However, these analyses are unrealistic, as they assume that a substantial part of the expected increase in basinwide consumptive use will not occur. In Appendix C-10 (Reclamation, 2020), Reclamation writes:*
>
> *"In this modeling, Colorado Basin future total annual depletions are significantly lower than those modeled in the 2012 Basin Study and the 2007 Final EIS of the Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead (Interim Guidelines EIS; Reclamation 2007a). This is because for the purposes of this analysis all depletions except the Southern and Highway Alternatives and those identified as reasonably foreseeable held at 2060 levels were held constant at 2020 depletion levels.*
>
> *"Elsewhere in Appendix C-10 and in the DEIS, Reclamation characterizes this modeling decision as providing "the maximum impact", but this is simply wrong. Each one of the seven Colorado River states plans to utilize fully all water that is physically and legally available to it. No justification is provided for this assumption of reduced basin-wide depletions, but even if one could be offered the assumption is scientifically incorrect and completely implausible and renders useless the hydrology results on which the DEIS is based.*
>
> *"Reclamation did include a "sensitivity analysis" wherein full basin-wide projected demands were used to simulate the Project, but only against the historical inflow scenario. Using the full basin-wide projected demands is the correct demand assumption, but that assumption should be used in the main analysis. (The use of the direct natural flows to represent "historical" conditions overstates the performance of the Project, as is described more fully below.)"*

Utah is a hot spot according to this map.[212] The average flow of the Colorado River has declined nearly 20 percent over the past century, half of which is because of warming temperatures.

5.5.7.2 Southern and Highway Alternatives

> *"The Proposed Project would contribute to **reduced** storage values in Lake Powell induced by reasonably foreseeable projects modeled in this analysis.*

211. Harding, B., Memorandum prepared for Conserve Southwest Utah: "Lake Powell Pipeline, Draft Environmental Impact Statement", Lynker Technologies, LLC, page 7, July 28, 2020, Appendix C.
212. Washington Post, "This giant climate hot spot is robbing the West of its water", August 7, 2020, at: https://www.washingtonpost.com/graphics/2020/national/climate-environment/climate-change-colorado-utah-hot-spot/

This contribution is within the variability affected by hydrology and is insignificant compared against both hydrologic variability and cumulative reasonably foreseeable projects (Attachment B of C-10, Hydrology). The Proposed Project would also affect hydrology as a result of the pipeline crossing rivers, washes, and streams, especially where future storm events may lead to erosion and scour. The Proposed Project would contribute to increased flows in the lower reaches of the Virgin River that were modeled in the VRDSM. This may offset other cumulative projects that reduce flows in those same stretches. This offset was not quantified within the VRDSM. Overall, construction and operation of the Southern and Highway Alternatives would contribute to the overall cumulative effects to hydrology in combination with other past, present, and reasonably foreseeable future action."

Coalition: We describe in our comments herein and in the Coalition's Appendix C how the DEIS hydrologic modeling makes the wrong assumptions on cumulative effects because the modeling didn't consider climate change impacts to the Colorado River.[213] It also didn't consider the possible effects of Drought Management Plans on being able to withdraw water for LPP from Lake Powell.

"The agreement about Colorado River drought contingency management, Reclamation, 2019, sets a target level of 3,525 ft as the elevation when actions will be contemplated to protect against excessively low levels in Lake Powell. While this is an operational target, it illustrates that action will be contemplated well before the Reservoir approaches minimum power pool. This provides a perspective on the degree of conservatism that can reasonably be expected in an Upper Basin DMP."[214]

5.5.8 Water Quality, page 264.

Coalition: The DEIS is deficient because it doesn't analyze the impact of using chemicals to control quagga mussels that could result in more nutrients in surface water which could create more toxic algae blooms in Quail Lake [215] and Sand Hollow Reservoirs. The Quail Lake Reservoir already has had a toxic algae outbreak.

The WCWCD captures most of the Virgin River water and delivers it to the cities and its reservoirs. Therefore, there is a concern that adding more chemicals to control quagga mussels could create more toxic algae in the WCWCD reservoirs.

About four million people visit Zion National Park each year, and the number is growing. The water quality in the Virgin River is becoming degraded. A new concern about the water quality in the Virgin River has developed. The North Fork of Virgin River is the largest watershed providing water to the Virgin River. A Salt Lake Tribune article detailed there is a severe problem to human health with the water quality of the North Fork of the Virgin River:

---

213. Harding, B., Memorandum prepared for Conserve Southwest Utah: "Lake Powell Pipeline, Draft Environmental Impact Statement", Lynker Technologies, LLC, pages 1-18 July 28, 2020, Appendix C.
214. Harding, B., Memorandum prepared for Conserve Southwest Utah: "Lake Powell Pipeline, Draft Environmental Impact Statement", Lynker Technologies, LLC, page 8, footnote 6, July 28, 2020, Appendix C.
215. The Spectrum, "Quail Creek Reservoir to close for chemical treatment", July 8, 2018 at: https://www.thespectrum.com/story/news/2018/07/09/quail-creek-reservoir-close/768620002/

"The harmful algae was found in multiple spots in the river.

"Why is it showing up now? We can't answer that," Gaddis said. "It's a new area for Utah. These sorts of blooms can be triggered by disturbances in the watersheds. It's not tightly linked to nutrient loads like blooms in lakes.

"The state has previously issued health warnings for E. coli impairment in the North Fork.

"The Southwest Utah Public Health Department has issued a public health warning for the affected areas of the river. The regional health department will post signs warning people of the risks of exposure to the river water."[216]

According to the Utah Department of Environmental Quality, "*Harmful algal blooms (HABs) develop when naturally occurring cyanobacteria in the water multiply very quickly to form green or blue-green water, scum, or mats. These blooms can produce potent cyanotoxins that pose serious health risks to humans, pets, and livestock.*"[217]

The DEIS is deficient for not considering the impact of chemicals used to prevent quagga mussels on the Sand Hollow aquifer project.[218] Included at the end of Study Report 5 is a study on the Sand Hollow's aquifer. See:

- Appendix A Revised Technical Memorandum 5.13C Aquifer Recharge Issues
- Appendix A Lake Powell Pipeline Phase I - Preliminary Engineering and Environmental Studies Task 5 - Develop and Analyze Alternatives Revised Technical Report 5.13C Aquifer Recharge Issues Prepared for Utah Division of Water Resources May 2009 Prepared by MWH

The report states that additional information is needed.

5.5.9.2 Southern Alternative, page 265

"The inter-basin transfer of Proposed Project water from Lake Powell to Sand Hollow Reservoir through the Proposed Project could result in transfer of undesirable and invasive aquatic organisms from the upper Colorado River basin to the Virgin River basin. While no LPP water would be directly discharged into the Virgin River or any of its tributary streams, Quail Creek Reservoir has an outlet to the Virgin River and a direct connection to Sand Hollow Reservoir via a connecting pipeline. All of the Proposed Project water conveyed through the pipeline would flow into Sand Hollow Reservoir for the specific purpose of providing M&I raw water supply for treatment in a water treatment facility and distribution as culinary water. Thus, implementation of the Southern Alternative would increase the overall threat to spreading

216. The Salt Lake Tribune, "Dangerous algal bloom turns up in Zion National Park after dog dies in North Fork of the Virgin River," July 4, 2020, at: https://www.sltrib.com/news/environment/2020/07/13/dangerous-algal-bloom/
217. The Utah Department of Environmental Quality, Harmful Algal Blooms, at: https://deq.utah.gov/water-quality/harmful-algTheal-blooms-home
218. Final Study Report 5 Groundwater Resources April 2016, Page 1-21 at, https://water.utah.gov/wp-content/uploads/LPP-Reports/GroundWater/20160430-05-Final-Groundwater-Resources-Study-Report_FINAL.pdf

quagga mussels to Sand Hollow and Quail Creek Reservoirs. Implementing the EPMs would minimize that risk to the greatest extent given the practicality of treatments to this specific project, while using the best available information to inform both the EPMs and mitigation measures. While Sand Hollow Reservoir is designated as a high-risk reservoir (see Section 1.4 of Appendix C-12, Aquatic Invasive Species), the Proposed Project would contribute to additional risks of quagga mussel infestation from other past, present, and reasonably foreseeable future actions to a watershed that currently has no established populations."

Coalition: Overall, construction and operation of the Southern Alternative would contribute to the overall cumulative effects to AIS in combination with other past, present, and reasonably foreseeable future actions.

5.5.13 Sensitive Species – Fish and Wildlife

Coalition: We are concerned about all new paved roads to be built to support the LPP infrastructure because when roads create barriers to movement, they can impact animal populations and water in many ways: [219]

One of these is through prohibiting gene flow. For example, in timber rattlesnakes, a study of genetics at hibernacula showed that in hibernacula that were blocked off by roads, genetic diversity was lower than in those that occurred across contiguous habitats. Additionally, some male snakes follow trails of pheromones along the ground in order to locate mates. Roads can disrupt the pheromone trail and make it difficult for males to follow the trails and find a mate.

Animals may also suffer by not being able to access particular habitats. In times of drought, roads can prohibit animals from reaching water. A study of turtles showed that roads could prevent gravid females from reaching their preferred nesting sites. As a result, they were relegated to suboptimal habitats where predation on their eggs was higher, which decreased reproductive success.

Pollution from roads extends beyond just chemicals, as light and noise pollution from roads can be detrimental as well. Noise from cars can impact birds by disrupting acoustic communication and interfering with warning signals, leading to bird population declines in the proximity of roads. Not all birds are equally affected, however, as those that have song frequencies similar to car frequencies are more likely to be absent from roadside areas. In addition to decreasing the numbers of birds, road noise can alter the community composition of birds as certain species are differentially excluded. Similarly, roads can interfere with the calling of frogs and make it difficult for them to find a mate."

Further the roads will also change all the washes that provide water now to plants and wildlife along the pipeline's route.

219. Environmental Science, "The Environmental Impact of Roads", at: https://www.environmentalscience.org/roads#_ENREF_12.

5.5.13.2 Southern Alternative

> *"The effects of the Southern Alternative, including RMPA Sub-alternatives, could contribute to existing and ongoing loss, fragmentation, and modification of vegetation and terrain that provide potential habitat for sensitive species. Direct and indirect effects of any one past, present, or future action are not likely to affect sensitive species or their habitat to the degree that existing populations would be affected. Lands managed by the BLM are managed for multiple-resource use. The NPS manages GCNRA and Pipe Spring National Monument in accordance with the NPS Organic Act of 1916, (54 USC 100101 et seq.) as amended, NPS Management Policies, and manages park resources using site...."*

Coalition: As detailed in our comments above the water exchange contract is to benefit the endangered Green River fishes yet the DEIS fails to do any analysis on these effects. We suggest there is no extra spring run-off the proponents can provide with the required equal exchange.

5.5.14 Threatened and Endangered Species, page 269, page 181.

> *"Mojave Desert tortoise (Gopherus agassizii) Threatened Designated Critical Habitat: Designated critical habitat is within the analysis area but 0.4 miles north of the LPP. Potential for effects to Mojave Desert tortoise and habitat occur on the westernmost portion of the Project Area in Washington County, Utah, on BLM-managed land, SITLA, and private lands.*
>
> *"Colorado pikeminnow (Ptychocheilus Lucius) and Razorback sucker (Xyrauchen texanus)" Endangered Designated Critical Habitat: The infrastructure associated with the LPP is located outside of the range for this species; however, because a component of the Proposed Project includes an LPP water exchange contract with Reclamation from Flaming Gorge Reservoir downstream to Lake Powell, effects to the species are considered."*

Coalition: The DEIS fails to adequately analyze the LPP's adverse impacts on threatened Mojave desert tortoises, or assess how those impacts would cumulatively contribute to the ongoing rapid declines in tortoise populations. On page 188, the DEIS acknowledges that the LPP would cross occupied tortoise habitat. It also acknowledges that the LPP would cause tortoise mortality, habitat loss, and habitat fragmentation. Table 3.15-4 on page 189 summarizes that there would be permanent adverse impacts on 27 acres of high-quality BLM tortoise habitat, and such impacts on 18 acres of BLM low quality habitat. Temporary adverse impacts would occur on high quality tortoise habitats: 167 BLM acres; 36 state acres; and 110 private acres. In total, about 533 acres of tortoise habitat would be adversely impacted. Given the lengthy duration and uncertainty associated with re-vegetation of disturbed soils and landscapes, and the potential for new ground disturbance to cause a major increase in cheatgrass and other invasive species (which adds to the threat of catastrophic wildfires), the so-called "temporary" impacts on tortoise habitats may actually take a very long time to heal. Tortoises in these locations would find it very difficult to survive for this extended period of time. We disagree that the tortoise impacts from building the LPP are "temporary." We outline in our comments how roads and the LPP right-of-way will permanently change water drainages that feed plants for the tortoises.

The DEIS on page 270 only vaguely acknowledges that the LPP impacts would "contribute" to the cumulative impacts causing the declining tortoise populations. Tortoise populations in Washington County are in serious trouble. Over the past two decades, tortoise population has declined by 41 percent and the population has declined by 24 percent. Elsewhere in the tortoise's range, these populations have similarly and rapidly declined in four of the five FWS recovery units, and some of these populations may already be below the level for future viability

5.5.15 Visual Resources, 5.5.15.3 Highway Alternative, page 271.

> *"The Highway Alternative visual resource cumulative effects would be nearly the same as described for the Southern Alternative. One additional cumulative effect could occur when combined with the effects of the Jackson Flat Reservoir project. The visual resource effects of the Highway Alternative near the Jackson Flat Reservoir would have* ***short-term cumulative effects*** *on the characteristic landscape because of changes in line, form, color, and texture introduced as a result of land disturbance caused by both projects. The* ***cumulative effects would diminish over time as the Highway Alternative becomes revegetated*** *near the Jackson Flat Reservoir."* (emphasis added)

Coalition: The southwest United States is in the throes of a megadrought, which started almost two decades ago. The DEIS does not acknowledge this or address contingencies for mitigating the scars left on the land if the drought continues. For example, what would be the added cost of providing water to remediation areas along the pipeline's route if the drought continues and vegetation is not reestablishing itself, especially along historic trails with high visual resource management values?

5.5.18 Indian Trust Assets, page 274.

Coalition: As mentioned above, the Northern Ute tribe has undeveloped senior water rights to the Green River Tributaries. Their concerns regarding moving water south per the water exchange contract to the proponents that have junior water rights to the Green River is troubling. The BOR has a responsibility to protect tribal water rights in the Colorado River basin and therefore a study should be completed on how much physical water there will be and who will have the priority rights to use it over the long term. An article in High County News discusses the tribes' concerns about protecting their undeveloped water rights:[220]

> *"2020 will also see the start of the renegotiation of the Colorado River Interim Guidelines. The guidelines, which regulate the flow of water to users, were created in 2007 without tribal consultation and are set to expire in 2026. The 29 tribal nations in the upper and lower basins hold some of the river's most senior water rights and control around 20% of its annual flow. But the tribes have often been excluded from water policymaking; around a dozen have yet to quantify their water rights, while others have yet to make full use of them. Most of the tribal nations anticipate fully developing their established water rights by 2040 — whether for agriculture, development, leasing or other uses. Drought and climate change are still causing shortages and uncertainty,*

220. High Country News This system cannot be sustained' This year, tribal nations enter negotiations over Colorado River water. Anna V. Smith INTERVIEW March 10, 2020 From the print edition, at https://conserveswu.org/2020/08/01/news/

however. Already, the Colorado River has dropped by about 20%; by the end of this century, it could drop by more than half."

High Country News spoke with Daryl Vigil of the (Jicarilla Apache, Jemez Pueblo and Zia Pueblo), water administrator for the Jicarilla Apache Nation.

Daryl Vigil said, "we're already seeing the impacts. And I think that's something that absolutely has to be considered in the planning of the future, because right now — with 41 million people in the basin — as of 2010, the imbalance between supply and demand is already a million acre-feet. It's projected, according to the basin study, to be 3 million acre-feet by 2060. We continue to act surprised when something new comes about in terms of a fire or a flood or an incredible drought. We're making an impact on this planet, and it's not a good one. That's where, with the Ten Tribes Partnership, (we're) really trying to make sure that we integrate those traditional, cultural values and spiritual values that the tribes have for the river as we move forward. Because if we're not going to address it, it looks pretty catastrophic to us. And so I think, when we start talking about climate change, absolutely pushing to make sure that we're thinking about a mindset of how we fit into nature, rather than nature fitting into us."

5.5.19 Socioeconomics, 5.5.19.2 Southern Alternative, page 275.

"The Southern Alternative would contribute to cumulative effects to regional socioeconomics, if the construction period coincided with the construction period of other reasonably foreseeable actions. Those effects would be temporary and beneficial from construction employment and associated expenditures. Overall, construction and operation of the Southern Alternative would contribute to the overall cumulative effects to socioeconomics in combination with other past, present, and reasonably foreseeable future actions."

Coalition: We mention herein that the DEIS social economic analysis is flawed because the BOR's analysis uses the concept of "Benefit Transfer." However this method assumes the LPP is 100 percent reliable, but it is not, as explained in the Lynker Memo Coalition comments Appendix C.[221] Economic or social effects—when a EIS is being prepared the economic or costs and natural or physical environmental effects are interrelated—should have been analyzed in the DEIS and were not.

As mentioned in 40 CFR §1508.14, an EIS should consider the cost of a project on the residents who have to pay for it and the DEIS does not. "Human environment" shall be interpreted comprehensively to include the natural and physical environment and the relationship of people with that environment. (See the definition of "effects" (§1508.8).) This means that economic or social effects are not intended by themselves to require preparation of an environmental impact statement. When an environmental impact statement is prepared and economic or social and natural or physical environmental effects are interrelated, then the environmental impact

221. Harding, B., Memorandum prepared for Conserve Southwest Utah: "Lake Powell Pipeline, Draft Environmental Impact Statement", Lynker Technologies, LLC, pages 1-18July 28, 2020 (Appendix C).

statement will discuss all of these effects on the human environment and the DEIS failed to do this.

INCOMPLETE STUDIES

The Coalition is concerned that there are gaps in the record that will interfere with the preparation of the final EIS. In some cases, critical data is left out. We described in detail those gaps in our comments above. Without this information in the record, decisions based on the final EIS will be fundamentally flawed.

The major flaw is that all of the 2016 study reports have the wrong No Lake Powell Alternative, which claims that Washington County will exhaust our supplies of "fresh water" by 2025, that the only water remaining was high in TDS and would have to be treated with reserve osmosis, and that xeriscaping would be forced on all residents. It shews and undermines the entire DEIS analysis. None of these assertions are true, but the 2016 studies were never updated. Even though BOR was alerted during scoping that their studies were outdated, BOR choose not to update the 2016 reports. (See scoping report in Appendix B.)

The 2016 studies all had the wrong assumption that we would run out of the water by 2025, but the DEIS has pushed that date to 2040. The LPP project's analyses, projections, and estimates have changed over time and continue to evolve even now. The need for water has changed; the proponents now claim LPP project water may not be needed until 2045—certainly not by 2025—as previously asserted. There is very little clarity, much less certainty, in previous claims about project cost, water availability, water supply, and desirability of conservation measures. It is of utmost concern that current data in proponents' studies be updated and made available to those who want a detailed and thorough understanding of this project so that informed decisions can be made before the final EIS. The NEPA process is supposed to examine environmental effects before an action is undertaken, and this has not happened because of the incomplete and outdated studies.

The DEIS is deficient because we requested that the BOR obtain the following information prior to preparing the draft EIS and it is not yet included:

1. A complete analysis of the proposed exchange of the Green River Block water right use because there is, in fact, a connected federal action. This would include the two BOR water service contracts involving water rights of 158,800 AFY depletions.

2. Documentation of Utah's high-water rights in the Green River tributaries of 158,800 AFY depletion and 320,000 AFY diversion to exchange with the BOR for the same amount of water out of Flaming Gorge Reservoir for the water right, which includes water for the LPP to complete the proposed action.

3. Description of the geographic scope in the EIS from the Flaming Gorge Reservoir to Lake Powell, and to include the Green and Colorado Rivers.

4. An analysis of how the proposal to divert water from Lake Powell is in accordance with the Law of the River such that Utah can effectively operate the proposed project over the 50-year term of the water exchange contract. According to the Colorado River Compact, Utah's Upper Basin water rights cannot be used in the Lower Basin, where the project is located. Also, the legislation of the Colorado River Storage Project is that Upper Basin reservoirs would assure water for the Lower Basin.

5. Analysis of how climate change will impact the Colorado River in ways that affect physical water availability for aquatic ecosystems and the LPP. What are the implications for the project to operate at full capacity in the future if the flows in the Green River and Colorado River continue to decline?

6. Analysis of Utah Water Laws and other laws that would have to be changed in order to preserve water in the Green and Colorado rivers for 400 miles for an instream flow for the benefit of the endangered fishes from Flaming Gorge Reservoir to Lake Powell Reservoir for the 50-year term of the water exchange contract.

7. Updates to the cost/benefit analysis to include a standard cost/benefit analysis that includes the cost of the proposed LPP, and not just relying on a superficial "benefits transfer" approach.

8. Analysis of the impact of Utah bonding for a $2-plus billion project on the state's ability to bond for other needed public projects.

9. Updated alternatives analysis that includes a reasonable conservation-only alternative, such as the Local Waters Alternative, that addresses a wider range of local water sources.

10. Completing a comprehensive study of probable flows, such as a Hydrological Determination, that focuses on a more recent period—less than the historical 100-year average of 15 MAFY at Lees Ferry. This would determine if Utah has a sufficient water supply for the Lake Powell Pipeline. See information on a Hydrological Determination for the Jicarilla Navajo reservoir service contract.[222] Also, see the Colorado River Basin Water Supply and Demand Study which concludes that the Basin faces a wide range of plausible future long-term imbalances between supply and demand.[223]

Additional Comments

The Bureau of Reclamation (BOR) said they would use the Federal Regulatory Energy Commission's (FERC) studies for the DEIS and would update them with current information. However, the project was fast tracked, and these updates to the studies didn't occur. Over the past twelve years, the Coalition has given detailed comments outlining the flaws in the FERC's studies. BOR recommended we resubmit our analyses for this new process. We sent them in PDF format during the scoping comment period, and we resubmitted them again for the DEIS comments. The comments are posted on FERC's website under eLibrary[224] Docket Number P-12966. The eLibrary website is where all the FERC comments on the project are filed. **Please include these comments into the DEIS comment record.**

After twelve years of commenting on the LPP for an eventual EIS, the BOR ignored the Coalition's and public's concerns and just adopted the proponents' point of view on the need for the LPP without evidence and without objective proper vetting of the project.

---

222. Interstate Stream Commission, Office of State Engineer, "Summary of the 2007 Hydrologic Determination relating to the Navajo settlement", November 5, 2007, at https://www.ose.state.nm.us/Legal/settlements/NNWRS/InitialDisclosures/Settlement%20Documents/Summary%20of%20the%202007%20Hydrologic%20Determination%20re%20Navajo%20Settlement%20110507.pdf.
223. The Bureau of Reclamation, "Colorado River Basin Water Supply and Demand Study," Fact Sheet, June 2013 at:https://www.usbr.gov/lc/region/programs/crbstudy/FactSheet_June2013.pdf.
224. Federal Energy Regulatory Commission, web site, eLibrary, at: https://www.ferc.gov/ferc-online/elibrary.

The Coalition comments are relevant because:

- In 2008, the groups wanted to be a part of the FERC process and have standing; therefore, they filed a Motion to Intervene, which is necessary to participate fully in a FERC process:
    - Conserve Southwest Utah (formerly Citizens for Dixie Future) et al., "Motion to Intervene by Citizens for Dixie's Future, Glen Canyon Institute, Sierra Club, Living Rivers, American Rivers, and Town of Springdale, Utah in P-12966", FERC eLibrary accession no. 20080102-5057 (January 2, 2008).[225]

- In 2008, the groups outlined their concerns in FERC's first scoping process that should identify issues to be included in the FERC's DEIS. These issues of concern have gone unanswered in the DEIS. We identified other local water supplies not counted by the WCWCD.
    - "ILP Comments or Study Requests of Natural Heritage Institute (CA)," on Scoping Document 1 and Pre-Application Document, and Additional Study Requests, eLibrary accession no. 20080707-5206 (Jul. 7, 2008);[226]
- The Coalition commented on what the studies for the environmental analysis for the LPP should contain.
    - See: "Lake Powell Pipeline Coalition's Comments on Proposed Study Plan and Scoping Document 2", accession no. 20081119-5130 (November 19, 2008)[227]
- The Coalition commented on the proposed studies that included the plans and reports for the LPP.
    - "Comments Lake Powell Pipeline Coalition," on Study Plans and Draft Study Reports, eLibrary accession no. 20110506-5125 (May 6, 2011);[228]
- The Coalition commented on the modified study reports for the LPP.
    - "Comments Lake Powell Pipeline Coalition," on Modified Draft Study Reports, eLibrary accession no. 20120323-5005 (Mar. 23, 2012);[229]
- The Coalition commented on the LPP's Preliminary License Proposal (PLP) and draft study reports. Based on our review of the PLP, the Coalition is concerned that the Project, as proposed, is legally and hydrologically infeasible.

---

225. LPPC, Comments to FERC on Project P-12966-001,"Motion to Intervene by Citizens for Dixie's Future, Glen Canyon Institute, Sierra Club, Living Rivers, American Rivers, and Town of Springdale, Utah", Project no. P-12966-000, January 2, 2008, at: https://conserveswu.org/wp-content/uploads/2020/06/FERC-Motion-to-Intervene-FINAL-2008.pdf.
226. LPPC, Comments to FERC on Project P-12966-001,"Comments of the Lake Powell Pipeline Coalition on Scoping Document 1 and Pre-Application Document, and Additional Study Requests", July 7, 2008, at: https://conserveswu.org/wp-content/uploads/2012/04/cdf-scoping-comments-pdf.pdf.
227. LPPC, Comments to FERC on Project P-12966-001, "Lake Powell Pipeline Coalition's Comments on Proposed Study Plan and Scoping Document 2", November 19, 2008, at: https://conserveswu.org/wp-content/uploads/2012/04/scoping-2-comments-final.pdf.
228. LPPC, Comments to FERC on Project P-12966-001, "Lake Powell Pipeline Coalition's Comments on Study Plans and Draft Study Reports", May 6, 2011, at: https://conserveswu.org/wp-content/uploads/2011/11/FERC_comments_FINAL_5-6-11_PDFJane.pdf.
229. LPPC, Comments to FERC on Project P-12966-001, "Lake Powell Pipeline Coalition's Comments on Modified Draft Study Reports", March 23, 2012, at: https://conserveswu.org/wp-content/uploads/2011/11/FERC-Comments-Modified-Reports.pdf.

- "Comments Lake Powell Pipeline Coalition," PLP and revised draft study reports eLibrary accession no. 20160229-5176 (February 29, 2016);[230]

- The Coalition commented on LPP's Notice Ready for Environmental Analysis (NREA) and detailed the over-allocation of the Colorado River and Utah's water rights.
  - "Comments Lake Powell Pipeline Coalition," NREA Comments eLibrary accession no.20181120-5012 (November 20, 2018).[231]

Conclusion

Things have changed since the Utah legislature passed the 2006 *Lake Powell Pipeline Development Act*. The cost of LPP has grown significantly since it was first conceived. In 1995, the price was estimated at $187 million, and it skyrocketed to $1-2 B in 2016.[232] Meanwhile, mid-century population projections have plummeted from 860,000 to less than 500,000, reducing demand. Yet, the proponents still push in the DEIS for the same amount of water for almost half the proposed population in the DEIS.

It is hard to avoid the conclusion that the State of Utah is rushing to get its "remaining Compact water rights" before there are more restrictions are placed on withdrawals from the Colorado River. The problem is the DEIS ignores the best available science on climate change. There may no longer be physical water that the proponents would have priority rights to support a permanent water project. We explained the issue in detail in our comments.

Accordingly, the proponents inflate the need for water any way they can, by insisting on a "second source," of water, by stretching the timeline out to 2075, by using a high and continuing "system loss" of 15.4 percent every year to 2075, by assuming no further water conservation after 2045, and by dropping any consideration of publicly supported water conservation alternatives and only evaluating the proponents' two construction alternatives.

In addition, the DEIS improperly inflates water demand by ignoring obvious trends. The population growth will slow and thereby revenues will fall to pay for the LPP causing water demand to decrease below the static 240 GPCD in 2045. Therefore, no further water efficiency after 2045 is not a valid assumption and the proposed system loss of 15.4% water loss to the year 2075 will be less over time. The secondary water needs are improperly forecast by including irrigation company water shares in the GPCD.

The DEIS also ignores water supplies available to Washington County and inappropriately minimizes those supplies it does acknowledge. The proponents only consider water that meets EPA standards for drinking water, and it ignores that the cities have their own water rights they can develop in the future see our comments on additional water supplies.

Further, the DEIS is not sufficient because it analyses the LPP as if it is a stand-alone project. The hydrological modeling used to show that the Virgin River's flows will be reduced over time

---

230. LPPC, Comments to FERC on Project P-12966-001, Lake Powell Pipeline Coalition's Comments on the Preliminary Licensing Proposal and Draft Study Reports", February 29, 2016, at: https://conserveswu.org/wp-content/uploads/2018/02/FERC-Comments-FINAL-2-29-16-1.pdf.
231. LPPC, Comments to FERC on Project P-12966-001, "Lake Powell Pipeline Coalition's Comments on the Notice that the Project is Ready for Environmental Analysis", November 19, 2018, at: https://conserveswu.org/wp-content/uploads/FERC-comments-2018-FILED-.pdf.
232. Lake Powell Pipeline. April 2016 Final Study Report 10 – Socioeconomics and Water Resource Economics. Appendix B: Draft Cost Opinion Master Summary. Capital cost estimate in December 2015 dollars. Prepared by Stantec, February 2016.

by climate change is not applied to the Colorado River being a viable second source of water for Washington County. Due to the project being fast-tracked, many studies were not updated. The DEIS also ignored any past public or non-government agencies over the 12 years of commenting on the LPP.

Oddly, the proponents plan to buy water for the LPP from The Colorado River Storage Project (CRSP) and approve the purchase using this DEIS. However, CRSP is not providing enough water to meet all the demands of the Colorado River Compact today. The outflows of water from Lake Powell and Lake Mead are more than the inflows, steadily draining the reservoirs. Common sense would dictate you wouldn't want to buy from a project that already can't provide enough water to their existing customers and not complete an analysis of the problem. The LPP water right does not have priority status that assures water to the project over the long term. This analysis is totally missing in the DEIS.

The LPP is neither legally nor hydrologically feasible as we detail in our comments. A Supplemental DEIS is required because much of the information is either lacking or wrong, and that has to be corrected.

Finally, but really of prime importance, is that the pristine lands that will be destroyed by the building the unnecessary LPP are more valuable to our nation to keep intact for future generations than an unnecessary and unaffordable water project.

We support the no action alternative.

Appendix A. Abbreviations

AF	Acre-feet
AFY	Acre-feet per year
BOR	Bureau of Reclamation
CFS	Cubic feet per second
CRC	Colorado River Compact
CRSP	Colorado River Storage Project
CSU	Conserve Southwest Utah
CUP	Central Utah Project
DEIS	Draft Environmental Impact Statement
DOI	Department of the Interior
EIS	Environmental Impact Statement
EWFB	Utah Executive Water Finance Board
FERC	Federal Energy Regulatory Commission
FGR	Flaming Gorge Reservoir
GPCD	Gallons per capita per day
GRAMA	Government Records Access and Management Act
LPP	Lake Powell Pipeline project
LPPC	Lake Powell Pipeline Coalition
LWA	Local Waters Alternative
M&I	Municipal and industrial
MAF	Million acre-feet
MAFY	Million acre-feet per year
NEPA	National Environmental Policy Act
RMP	Resource Management Plan
RO	Reverse osmosis
TDS	Total dissolved solids
THM	trihalomethane
UBWR	Utah Board of Water Resources
UCRBRIP	Upper Colorado River Basin Recovery Implementation Program
UDWRe	Utah Division of Water Resources
UDWRi	Utah Division of Water Rights
WNA	Water Needs Assessment
WRA	Western Resource Advocates

Appendix B. Lake Powell Coalition Comments on Bureau of Reclamation Lake Powell Pipeline Project Draft Environmental Impact Statement Public Scoping Report February 2020

Purpose: Determining whether and how comments submitted during the scoping process are captured in the LPP DEIS Scoping Report. This may determine whether they will be addressed in the draft Environmental Impact Statement for the Lake Powell Pipeline itself. BOR responses to scoping comments are identified by Section heading and page number from the Scoping Report and are italicized. The Lake Powell Pipeline Coalition's (Coalition) comments are plain text.

Coalition: We submit these comments into the record to outline how comments submitted during the scoping process were not addressed in the DEIS. BOR responses to the scoping comments are identified by Section heading and page number from the Scoping Report and are italicized. The Lake Powell Pipeline Coalition's (Coalition) comments are plain text.

1.2 Purpose of Scoping, page 2.

> *"NEPA requires public involvement in determining the scope of the EIS analysis. The public involvement process is designed to contribute to an exchange of constructive ideas, discussion of alternatives, and determination of possibilities for mitigating potential environmental impacts associated with the proposed LPP Project. Reclamation recognizes that public involvement is more than just information gathering and should be considered a 'value-added' process. Reclamation plans to inform and involve members of the public so they can effectively participate in the LPP project NEPA process."*

Coalition: The DEIS is deficient because the BOR failed its responsibility to consider the scoping comments in determining the scope of the DEIS. Also, the BOR did not consider comments from commenters provided during the 12-year FERC licensing process for the Lake Powell Pipeline project. We detail our concerns that the DEIS was not properly defined because the BOR ignored scoping comments.[1]

1. Regulations regarding scope and content of an environmental impact statement:
40 CFR § 1501.7 – Scoping. (a)(2) Determine the scope (§ 1508.25) and the significant issues to be analyzed in depth in the environmental impact statement.
40 CFR § 1502.4 Major Federal actions requiring the preparation of environmental impact statements. "Agencies shall make sure the proposal which is the subject of an environmental impact statement is properly defined. Agencies shall use the criteria for scope (§ 1508.25) to determine which proposal(s) shall be the subject of a particular statement."
40 CFR § 1502.22: Agencies must disclose when information is incomplete or unavailable and whether it is essential to a "reasoned choice among alternatives."

2.2 Public Scoping Meetings, page 4.

> *"The purpose of public scoping is to identify issues, needs, and concerns of stakeholders, special interest groups, and the general public, as well as to inform alternative development. Copies of the public scoping meeting materials are included in Appendix B."*

Coalition: The BOR's scoping report is supposed to document the concerns submitted to BOR and should be used to determine the scope of the DEIS. However, the DEIS is deficient because it did not address many public concerns; we list those omissions below.

3.2 Methodology for Processing Scoping Comments, page 7:

> *"The Reclamation NEPA team identified each of the comments as either substantive or nonsubstantive. Guidance from the Bureau of Land Management (BLM) National Environmental Policy Act Handbook (2008) was followed in this classification of the comments. According to the 2008 BLM Handbook, unique and substantive comments are defined as being specific and doing one or more of the following:*
>
> *• Questioning, with reasonable basis, the accuracy of information in the NEPA document;*
>
> *• Questioning, with reasonable basis, the adequacy of, methodology for, or assumptions used for the environmental analysis;*
>
> *• Presenting new information relevant to the analysis;*
>
> *• Presenting reasonable alternatives other than those analyzed in the NEPA document; and/or*
>
> *• Causing changes to or revisions of the alternatives (BLM 2008).*

Coalition: BOR ignored its guidance in 3.2 methodologies evaluating the comments submitted during scoping that should have been in the scope of DEIS and instead adopted the proponents unsupported claims for the scope of the DEIS.

3.4 Summary of Scoping Comments by Issue Category, 3.4.2 Alternatives, page 8:

> ***"****A total of 114 comments were received concerning the Proposed Project alternatives. The comments primarily concerned utilizing a water conservation alternative; this included suggestions for limiting irrigation of lawns and golf courses, which they purport would make the pipeline unnecessary."*

Coalition: The BOR used a wrong assumption to make its decision to drop a water conservation alternative to use for DEIS. The BOR mischaracterized requests to objectively explore reasonable alternatives such as those relying on water conservation and local supplies, which were requested by many people during scoping. They implied that these were primarily "suggestions for limiting irrigation of lawns and golf courses" when, in fact, they also included management changes such as increased and substantially tiered water rates and increasing local supplies. The public has asked for 12 years that FERC evaluate in an unbiased way a water

conservation alternative using local supplies. However, the BOR choose not to vet the proponents' claims about water conservation and used the proponents' very flawed Alternatives Study Report #22 to eliminate any consideration of an alternative relying on water conservation and local supplies. The BOR used Alternatives Study Report #22 to eliminate any water conservation alternative because of the high cost. We note that Alternatives Study Report #22 was not provided to the public in the DEIS.

The DEIS is deficient because the BOR did not do a rigorous analysis of alternatives that the public could understand; therefore, it violated NEPA, among other regulations.[2]

3.4.5.4 Aquatic Invasive Species, page 9.

> *"Thirty comments were received concerning aquatic invasive species. Many of the comments focused on invasive quagga mussels and their possible infestation of the water supply."*

Coalition: There were 30 substantive and 12 nonsubstantive comments which raised issues regarding aquatic invasive species. The BOR did not adequately address these concerns in the DEIS because it only described how the quagga mussels will be kept within the pipe and how the agencies intended to manage them and not disclosing the risks.

The DEIS is deficient because it violated NEPA with respect to the environment affected by the proposed project.[3]

3.4.6 Climate Change and Greenhouse Gases, page 9.

> *"A total of 43 comments addressed climate change and greenhouse gases. The comments were primarily related to what the short and long-term effects of the water supply would be and how the river flow could be affected by the proposed LPP Project."*

Coalition: In the DEIS the BOR got it backward; it was not asked how the LPP would affect supply from the Colorado River, but just the reverse, how predicted decreases in Colorado River flows would affect water availability for the LPP; as a result, the BOR used the wrong data. This DEIS fails to apply the BOR's studies in 2012 The Colorado River Basin Water Supply and Demand Study, wherein scientists are expecting less water and water availability over the long term. The current DEIS analysis is very questionable and based on the wrong information.

The DEIS is deficient because it violates NEPA.[4]

---

2. Regulations that address consideration of alternatives include:
40 CFR § 1502.14 Alternatives including the proposed action. An EIS must assess impacts of proposal, including "reasonable alternatives not within the jurisdiction of the lead agency."
40 CFR § 1502.22: Agencies must disclose when information is incomplete or unavailable and whether it is essential to a "reasoned choice among alternatives."
40 CFR § 1500.1(b) NEPA's purpose is to ensure that environmental information is available to decision makers before decisions are made; it emphasizes that "accurate scientific analysis" is "essential."
3. Regulations that define breadth of analyses:
40 CFR § 1502.15 Affected environment. "The environmental impact statement shall succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration."
42 U. S. C. § 300f. Safe Drinking Water Act
4. Regulations that address lack or quality of information used:

3.4.8 Cumulative Effects, page 10.

> *"A total of 17 comments were received regarding cumulative effects. The commenters were primarily concerned with population growth and sprawl, as a result of the pipeline and a larger availability to water resources/supply."*

Coalition: Contrary to the BOR's characterization of cumulative impact comments as "primarily concerned with population growth and sprawl," there were far more substantive comments regarding cumulative impacts on Mojave desert tortoise and other native species' habitats, economic costs on top of other increased taxes and fees, ensuring water for downstream uses and users, soil salinity and reservoir siltation, wetlands, public lands, and public land protection designations, speed of climate change, and fossil fuel use and pollution to pump water uphill 2,000 feet.

The DEIS is, therefore, deficient because it violates NEPA.[5]

3.4.19 Native American Concerns, page 11.

> *"Eight comments addressed Native American concerns. Some of the commenters expressed their concerns with a water supply and the water rights of tribes in the region. By transporting water away from the area, the stakeholders are concerned with the availability of water for those tribal communities."*

Coalition: BOR ignored the Ute Indian Tribe of the Uintah and Ouray Reservation (Northern Ute tribes') concerns about moving the remaining physical water south, which would result from the signing of the proponents' water exchange contract. The Northern Utes have senior water rights to the Green river Tributaries. One of the original intents of CRSP was to provide water for the Ute Unit of the Central Utah Project. The Ute unit was never built, and now BOR assigned that water to the State of Utah that has water rights to the Green River Tributaries but that are junior to the tribes' rights. The Central Utah Project was built in 1968 using high spring flows of the Green River Tributaries. It is unclear how the State of Utah can pledge spring run-off to the endangered Green River fishes when the Ute Tribe has senior water rights to most all of the Green River Tributaries. Utah has still not completed a settlement agreement with the Ute Tribe.

Even though the proponents' water rights are very junior to the tribes, the BOR is showing a preference in the DEIS by selling CRSP project water to the proponents. This sale could violate the Colorado River Compact if Congress and the other basin states do not agree, The BOR does not even attempt to protect the tribe's physical water rights. BOR is blindly over-allocating any remaining physical water by promises to far too many entities without any analysis of the amount of physical water that remains, now and in the future. After twelve years of the public asking in scoping and other comment opportunities for the proponents to prove they have valid

---

40 CFR § 1502.22: Agencies must disclose when information is incomplete or unavailable and whether it is essential to a "reasoned choice among alternatives."
40 CFR § 1500.1(b) NEPA's purpose is to ensure that environmental information is available to decision makers before decisions are made; it emphasizes that "accurate scientific analysis" is "essential."
5. Regulations that address cumulative impacts:
32 CFR § 651.16 Cumulative impacts. "NEPA analyses must assess cumulative effects, which are the impact on the environment resulting from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions."

water rights for the project, this critical question remains unanswered, and BOR has not pursued the issue in the DEIS.

The DEIS is deficient because it violates NEPA.[6]

3.4.20 NEPA Process page 11.

> *"As part of the scoping process, a total of 42 comments were received that addressed the NEPA process. Many of the commenters requested an update to the Federal Energy Regulatory Commission's (FERC) studies with findings that include climate change, water projections, and population growth. The comments showed concern for using outdated studies, which may misguide decision-making."*

Coalition: The commenters questioned the accuracy, methodology, and assumptions used, and a need to present updated information and alternatives. However, BOR did not adequately address the FERC comments over the years and failed to explain how those studies were not flawed and incomplete. BOR did not vet the proponents' information and used outdated information to make decisions on the Lake Powell Pipeline.

The DEIS is deficient because federal agencies must use accurate data throughout the decision-making process, and the DEIS, therefore, violated NEPA.[7]

3.4.22 Proposed Project Cost (Other), page 11.

> *"A total of 41 comments were received that addressed proposed LPP Project costs. Many of the commenters were concerned with the cost of the proposed LPP Project to taxpayers and the overall cost of the proposed LPP Project. Several questioned whether residents of Washington and Kane County would fund the proposed LPP Project, or if the entire state would provide funds. Additionally, many suggested that a water conservation alternative would save taxpayer money and avoid the proposed LPP Project altogether."*

---

6. Regulations that address purpose of and alternatives addressed in environmental impact statements:
40 CFR § 1500.1(b) NEPA's purpose is to ensure that environmental information is available to decision makers before decisions are made; it emphasizes that "accurate scientific analysis" is "essential."
40 CFR § 1502.14 Alternatives including the proposed action. An EIS must assess impacts of proposal, including…"reasonable alternatives not within the jurisdiction of the lead agency."
40 CFR § 1502.15 Affected environment. "The environmental impact statement shall succinctly describe the environment of the area(s) to be affected or created by the alternatives under consideration."
40 CFR § 1502.22: Agencies must disclose when information is incomplete or unavailable and whether it is essential to a "reasoned choice among alternatives."
7. Regulations that address accuracy and quality of data, analyses and alternatives used in environmental impact statements:
40 CFR § 1500.1(b) NEPA's purpose is to ensure that environmental information is available to decision makers before decisions are made; it emphasizes that "accurate scientific analysis" is "essential."
40 CFR § 1500.1(c) NEPA's process is intended to help public officials make decisions that "are based on understanding of environmental consequences," "and take actions that protect, restore, and enhance the environment."
40 CFR § 1502.14 Alternatives including the proposed action. An EIS must assess impacts of a proposal, including…"reasonable alternatives not within the jurisdiction of the lead agency."
40 CFR § 1502.22: Agencies must disclose when information is incomplete or unavailable and whether it is essential to a "reasoned choice among alternatives."
40 CFR § 1502.24, Methodology and scientific accuracy. "Agencies shall [e]nsure the professional integrity, including scientific integrity, of the discussions and analyses in environmental impact statements."

Coalition: To pay for the project, Washington County residents will see a quadrupling in water rates, a doubling in impact fees, and a 50% increase in property taxes going to Washington County Water Conservancy District (WCWCD). However, it is questionable whether the pipeline is financially viable for Washington County. The DEIS exaggerates benefits, relying on "benefits transfer" models, and proposes a 100-year period to recover costs.

The DEIS is deficient because it violates NEPA.[8]

3.4.24 Purpose and Need, page 11.

> *Among the comments received, 24 addressed the purpose and need of the EIS. Many of the commenters felt that the proposed LPP Project did not have a clear purpose and need and would like more details on the amount of water to be conveyed and cost of the proposed LPP Project overall.*

Coalition: The real need for water has not been established by the proponents. The proponents have inserted an arbitrary requirement for a second source of water from the already over-allocated Colorado River. The purpose and need still is not clear regarding the date when water will be needed.

Since the Utah legislature passed the 2006 LPP Development Act, population projections for Washington County for 2060 have decreased from about 860,000 to below 500,000. Meanwhile, the cost has skyrocketed from $187 million in 1995 to more than $2 billion in 2019. To justify a need for the LPP the proponents added an arbitrary 15.4% "system loss" factor and a 15-year "reserve buffer" (providing water in any given year for a population 15 years into the future), adding a total demand of 30% more water and stretching the timeline from the 2060 year to 2075.

The DEIS thus violated NEPA because BOR does not justify when the additional water supply is needed.

3.4.25 Recreation, page 12.

> *"As part of the scoping process, four comments were received regarding recreation. Many commenters addressed concern for the quality of the recreational land and its remoteness from other infrastructure and worried that with a large pipeline, some of the integrity of the area will be lost. Additionally, the general area in which the proposed LPP Project would be located attracts many tourists, and the commenters expressed concerns that a large-scale construction effort would detract from tourism and thus lead to economic loses."*

Coalition: The DEIS is deficient because it doesn't include infrastructure impacts more than 750 feet from the pipeline. These impacts include:

---

8. Rules for analyses include:
40 CFR § 1508.8 Effects. Agencies are to assess direct and indirect effects (synonymous with impacts); and indirect direct effects include those which "occur at a later same time and place but are still reasonably foreseeable."
40 CFR § 1502.23 Cost-benefit analysis should not be "displayed in monetary terms when there are important qualitative considerations" and should "includ[e] factors not related to environmental quality, which are likely to be relevant and important to a decision."

The Lake Powell Pipeline's infrastructure and its supporting infrastructure would scar iconic and scenic landscapes, block wildlife movements, and disturb ancient archaeological sites along its route. Proposed new structures include six hydroelectric plants 25′ high, each with a substation and five pump stations 35′ high, each with a substation with power lines, high steel power poles connecting them to existing power grids, cell towers, parking lots, two substations along the power lines, lights, newly paved access roads, regulating tanks and reservoirs, manholes, air release valves, vacuum relief valves, blow-off valves, fencing, buried forebay tanks, buried surge tanks, and surface overflow detention basins all of which require weekly maintenance. The operation, maintenance, repair, and excavation of the pipeline would significantly degrade the region's scenic beauty, its wildlife, and its wildland remoteness.

Further, they will drill temporary water well every 5 miles to provide water for construction that would include electric power. The project would disturb 53 square miles of excavated soils to build the pipeline.

3.4.34 Water Law, page 13.

> *"A total of 64 comments were received addressing water law and water rights of other states and tribes. Many commenters addressed concerns over watersheds and water rights of the upper and lower basins and the security of Utah's water claims in their submittals."*

Coalition: The DEIS is deficient because it did not disclose the State of Arizona stating this transfer is not legal under the Compacts rules and would need congressional approval for such a transfer. The DEIS should evaluate the project purpose in light of probable reductions in the Colorado River hydrologic flow regime, long-term drought-related reductions in water availability, and the sharing of deficits among the seven Colorado River Basin states that would be renegotiated in the *Interim Operation Guidelines*.

BOR is silent about these concerns in the DEIS. BOR spends considerable effort to model changes in Lake Powell levels as a result of providing 86,249 AFY to the LPP. Still, it fails to analyze whether there will be any water at all available from Lake Powell for the LPP.

The DEIS is deficient because it violates NEPA.[9]

3.4.35 Water Resources, page 13.

> *"Among the substantive comments received, 68 addressed the potential negative effects of water resources, including groundwater and water quality. Many of the commenters expressed concern about water usage, including over-irrigation, low water prices, and lack of desert landscaping for businesses and homes. Others expressed concerns regarding the many streams and springs the proposed LPP Project would cross and how the proposed LPP Project would affect the water quality."*

Coalition: The DEIS is deficient because it violates NEPA by not addressing any of these concerns.

---

9. Regulations that address analysis include:
40 CFR §1508.27 Significantly. Especially requiring analysis of: (b)(5) "The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks."

3.4.36 Water Supply, page 13.

> *"Among the substantive comments, 99 addressed water supply and availability. Commenters were concerned with the long-term availability of water from the Colorado River with the onset of climate change, as well as the use of reclaimed water and rainwater for landscaping and irrigation."*

Coalition: The DEIS does not adequately address the concerns that climate change will affect water availability for the LPP.

The DEIS is deficient because it violates NEPA by not addressing well-documented trends in water resource availability.[10]

4.2.1 Current Operations and Delivery System.

> *"The cities and towns in Washington* County *have historically developed independent water collection and treatment systems; however, since WCWCD's first project in the mid-1980s, the major municipal water systems have become increasingly integrated. The majority of WCWCD system water is delivered to municipal customers who serve over 85 percent of the population of the county. WCWCD water supply systems include the following major facilities."*

Coalition: The DEIS information is not correct. Municipalities provide about half the water to their population. In addition, municipalities have more water rights they could develop in the future. These supplies are not currently counted as future supply by the proponents

The DEIS is deficient because it violated NEPA.[11]

Conclusion: BOR ignored the FERC scoping comments of 2008 in their analysis. Concerns raised by commenters during the 2008 scoping process continue today without reconciliation by BOR in this DEIS. At FERC eLibrary 20080821-3005, Scoping of Environmental Issues for the proposed Lake Powell Pipeline Project, August 21, 2008, p.7.

These include, as acknowledged by FERC:

> *"As shown in both the transcripts of the scoping meetings and in Appendix A, many individuals have provided either oral or written scoping comments, or both, concerning the Lake Powell Pipeline proposal.*
>
> *"Many of the public comments express similar concerns or issues:*
>
> *"1. increased water conservation can delay the need for the pipeline or other water supply projects*

---

10. Regulations that require analysis of effects include:
40 CFR § 1500.1(c) NEPA's process is intended to help public officials make decisions that "are based on understanding of environmental consequences," "and take actions that protect, restore, and enhance the environment."
11. Regulations governing NEPA analyses include:
40 CFR § 1502.22: Agencies must disclose when information is incomplete or unavailable and whether it is essential to a "reasoned choice among alternatives."
40 CFR § 1502.14 Alternatives including the proposed action. An EIS must assess impacts of proposal, including…"reasonable alternatives not within the jurisdiction of the lead agency."

> *"2. supplying water to allow the predicted population growth will diminish the quality of life in the region;*
>
> *"3. the estimated cost of the pipeline is increasing and little is known about how the final cost of the pipeline will affect fees and the taxes and rates paid by water users;*
>
> *"4. continued droughts and climate effects from human activity could put the supply of water from Lake Powell Reservoir at risk."*

As a result, this DEIS is deficient in its analysis and violates NEPA.

Appendix C. Lynker Technologies Memorandum, July 28, 2020

MEMORANDUM

To: Conserve Southwest Utah

cc:

From: Ben Harding, Lynker Technologies, LLC

Subject: Lake Powell Pipeline, Draft Environmental Impact Statement

Date: July 28, 2020

Introduction and summary

This memorandum addresses water supply for the Lake Powell Pipeline Project and the adequacy of the Draft Environmental Impact Statement for the Project (DEIS).

The Lake Powell Pipeline Project (the Project) is proposed to deliver 86,249 acre-feet (af) of water annually from Lake Powell to Washington County, Utah. The DEIS infers that this full amount would be available every year, but in fact in many years the Project would almost certainly be limited to a lower or to no yield by curtailments under the Colorado River Compact and the Upper Colorado River Basin Compact arising from a flow shortfall on the Colorado River at Lee Ferry (Castle and Fleck, 2019; Harding, 2019). These curtailments would reduce the reliability of the project (and its average, long-term yield) and would consequently reduce the ability of the project to fulfill its declared purpose and need and would reduce its water supply benefits. What is generally unrecognized is that these curtailments are also mechanisms whereby operation of the Project can impair the operation of other more senior Colorado River water rights in Utah, and Colorado River water rights in the States of the Lower Division, impacts that have not been addressed in the DEIS.

The DEIS has also employed analytical methodological choices that overstate the performance of the project and understate its impact on other water rights, and it has not reported analytical results that directly quantify the expected reliability and impacts of the project. The results that are presented in the DEIS suggest that the Project would not be able to deliver its full yield, and possibly any yield, on average about every 4 to 7 years. In any year in which the Project is fully curtailed an impairment of other water rights would almost certainly occur.

The DEIS is deficient for the following reasons:

- It assumes that the Project will be 100% reliable, that is that it will supply its nominal yield of 86,249 af every year during its operational life. The available evidence and analyses suggest that the project yield will be reduced or eliminated in many years due to curtailments of water use in Utah under the Colorado River Compact and the Upper Colorado River Basin Compact;

- It does not evaluate and describe the degree to which curtailments caused by the Project would cause impairment of senior water rights within Utah;
- It does not evaluate and describe the degree to which depletions from Lake Powell by the Project could impair water rights in the Lower Basin;
- It does not evaluate and quantify the effect of climate change on the performance of the Project; it simply assumes that the Project will be able to deliver its nominal yield in every year during its operational life;
- The hydrology analyses on which the DEIS is based, and Reclamation's 2012 Basin Supply and Demand Study suggest that the project will be unable to deliver its full yield or any yield at all in many years in the future, but the results of these analyses are ignored in the DEIS;
- The hydrology analyses on which the DEIS is based and Reclamation's 2012 Basin Supply and Demand Study have methodological shortcomings that result in overstatement of the performance of the Project and understatement of its impacts.

These issues are addressed in detail in the rest of this memorandum.

1. Stated Purpose and Need for the Project

The project is to supply 86,249 af of water annually to new uses in Washington County. A full supply of water from the Project is proposed to be available by 2060 and presumably to continue indefinitely over the unspecified operational life of the Project.

The Project proponents intend for the project to meet these additional planning objectives:

1. Diversifying the regional water supply portfolio by providing a second source of water for Washington County;
2. Providing for system reliability by developing a secure source of water;
3. Providing for system redundancy in the event of system failure due to disasters or aging infrastructure;
4. Accounting for climate change scenarios; and
5. Accounting for long-term uncertainty when considering the summed effect of the vulnerability to the water supply.

Objectives 1-3 require that the Project supply water reliably. The Purpose and Need Report (Table 7.2-2; page 16) assumes that the project would supply its full yield of 86,249 af 100% of the time. The DEIS provides an estimate of benefit due to water supply reliability of $1.9 billion (Table 3.2-8; page 241). These benefits are all attributable to the Project; no water reliability benefits are attributed to the No Action Alternative. The DEIS provides no analysis of the reliability of the Project but the hydrologic modeling results found in various DEIS documents suggest that the Project would be substantially unreliable.

2. The mechanism and effects of compact curtailment of Utah water rights.

2.1. The law of the river (after Harding, 2019).

The Colorado River system is managed and operated in accordance with the "Law of the River", which consists of compacts, treaties, federal and state statutes, court decisions and decrees, contracts, and regulations. See MacDonnell, et al. (1995), Wilbur and Ely (1933), Wilbur and Ely (1948), Nathanson (1978) and Verburg (2010). A comprehensive and convenient compilation is at Weisheit (2010).

The Colorado River Compact (CRC; 1922) and the Upper Colorado River Basin Compact (UCRBC; 1948), the principal elements of the Law of the River, set constraints on consumptive use of water in the Upper Basin of the Colorado River. A water treaty with Mexico (1944) created a federal obligation to deliver water from the Colorado River system at the international border.

Article II of the Colorado River Compact defines the Colorado River System and divides it into the Upper Basin and the Lower Basin. Lee Ferry, a point on the Colorado River main stem one mile below the mouth of the Paria River, divides the two basins. Article II also partitioned the states into the States of the Upper Division (Upper Division: Colorado, New Mexico, Utah and Wyoming) and the States of the Lower Division (Lower Division: Arizona, California and Nevada)

Article III(a) of the Colorado River Compact apportions to each basin 7.5 million acre-feet (maf) per year of consumptive use of the waters of the River. Article III(b) grants an additional apportionment of 1 maf per year of consumptive use to the Lower Basin.

The Mexican Water Treaty of 1944 established a federal obligation to deliver 1.5 maf of water per year to Mexico. Article III(c) of the Colorado River Compact sets out terms by which that treaty obligation would be shared between the Upper Division and the Lower Division--some portion of that federal delivery obligation may be the responsibility of the Upper Division. Interpretation of these provisions is controversial (CRGI, 2010). The federal obligation is often assumed to be equally apportioned between the Upper and Lower Divisions, but under the most severe interpretation, the Upper Division may bear transit losses on its share of the delivery obligation and may thus owe more than 0.75 maf/year at Lee Ferry. A conventional interpretation of Article III(c) is that the Mexican Treaty delivery is an annual obligation.

Article III(d) of the Colorado River Compact sets out the terms of an obligation on the Upper Division not to cause the 10-year cumulative flow at Lee Ferry to be depleted below 75 maf. This flow obligation will likely be the principal limiting constraint on consumptive use in the Upper Basin. The framers of the Compact expected that annual natural flows at Lee Ferry would typically substantially exceed 16 maf, which would satisfy the apportionments in Article III(a) and (b), and the obligations in Articles III(c) and (d), and leave a surplus, but that expectation is now understood to have been optimistic (Kuhn and Fleck, 2019). The delivery obligation of the States of the Upper Division for a share of the Mexican Treaty under Article III(c), and the non-depletion flow obligation under Article III(d) constitute a "combined flow obligation".

Article VIII of the Colorado River Compact exempts Present Perfected Rights (PPRs) in the Upper Basin from the apportionment and obligations set out in Article III[1].

The Upper Colorado River Basin Compact (UCRBC) apportions water among the Upper Basin states and sets out principles for curtailment in the event of a flow shortfall in Article III of the Colorado River Compact. Note that the UCRBC refers to Article III of the CRC in its entirety, and thereby incorporates shortfalls to any delivery required to satisfy any obligation of the States of the Upper Division to meet the federal Mexico Treaty delivery obligation.

Article III of the UCRBC sets out the apportionment of water among the States of the Upper Division and Arizona. Arizona is apportioned a fixed 50,000 af; the apportionments among the States of the Upper Division are set out as percentages of, "…the total quantity of consumptive use per annum apportioned in perpetuity to and *available for use each year* by Upper Basin under the Colorado River Compact and remaining after the deduction of the use, not to exceed 50,000 acre-feet per annum, made in the State of Arizona" [emphasis added], which are: State of Colorado, 51.75%; state of New Mexico, 11.25%, state of Utah, 23.00%; and state of Wyoming, 14.00%. The term "available for use each year" in Article III recognizes that, under some hydrologic conditions, the amount of water available for consumptive use in the States of the Upper Division may be less than the amounts set out in Article III(a) of the CRC, due to operation of Articles III(c) (treaty obligation to Mexico) and III(d) (Upper Division obligation) of the CRC, however those might be interpreted.

Article IV of the UCRBC sets out the procedures and requirements for curtailment of use in the States of the Upper Division (no provision is made to curtail any overuse in Arizona). Several parts of that article are important. First it requires the immediate "repayment" of over-consumption (relative to its or their percentage apportionment) by a state or states prior to any additional curtailment of use in other states. Second, after repayment of overconsumption, apportionment of any necessary curtailment is based on actual water use during the water year immediately preceding rather than on the percentages set out in Article III(a)(2). Third, it defines Present Perfected Rights according to the date of adoption of the CRC by the negotiators on November 24, 1922.

The principal reservoir in the Upper Basin is Lake Powell, with a current active capacity of approximately 20 maf, impounded behind Glen Canyon Dam, about 18 miles above Lee Ferry. Construction of Glen Canyon Dam, closed in 1963, added another layer to the Law of the River in the form of operating rules (Reclamation, 1970) legislated as part of the Colorado River Basin Project Act (1968), as subsequently updated (Verburg, 2010).

What might be the future interpretation of each of the elements of the Law of the River, and how they may be implemented, is broadly contentious and their precise nature will only be resolved by negotiation or prolonged litigation, or both (Robison and Kenney, 2012).

2.2. Curtailment of consumptive use in the Upper Division under the Colorado River Compact

In general terms, if the flow at Lee Ferry falls below the combined flow obligations set out in Article III(c) and Article III(d)--however these may eventually be interpreted--consumptive use in the Upper Basin must be curtailed to the degree necessary to offset any flow

1. PPRs will not be curtailed even if the flow obligation at Lee Ferry or the federal delivery obligation to Mexico are unmet.

shortfall, except that PPRs are not subject to curtailment, according to the principles set out above under Article IV of the UCRBC.

2.3. Curtailment of water use by Utah under the Upper Colorado River Basin Compact.

In the event of a flow shortfall at Lee Ferry and a consequent curtailment of consumptive use among the States of the Upper Division, if Utah has, over the previous ten years, consumptively used more than 23% of the water determined to have been available for consumptive use in the States of the Upper Division, it would immediately have to curtail use (or deliver stored water) until that amount has been offset. If, after repayment of all overconsumption, a shortfall still remains at Lee Ferry, Utah (along with the other States of the Upper Division) would have to curtail its use or deliver stored water in the proportion that its consumptive use in the previous year bears to the total consumptive use in the previous year among the States of the Upper Division.

2.4. Curtailment of use under water rights within Utah

Should curtailment of consumptive use in the State of Utah become necessary, the Utah Division of Water Resources would have the responsibility of curtailing use under Utah water law, according to priority of appropriation date, subject to preferences in the event of a declared temporary water shortage emergency (Utah Code Ann. § 73-3-21.1). Curtailment of consumptive use under water rights perfected prior to November 24, 1922 (Present Perfected Rights) would not be necessary.

2.5. Utah's apportionment of water will vary depending on hydrology

The quantity of water available for consumptive use in the Upper Basin in any year is a function of the hydrology over the period between the time when reservoir storage above Lee Ferry is full and the reservoir is spilling and the time of a shortfall in the combined flow obligation at Lee Ferry. In general terms, the amount of water available for consumptive use in the Upper Basin during a dry spell is the water stored in reservoirs above Lee Ferry (primarily Lake Powell) plus the cumulative natural flow of the river at Lee Ferry, less cumulative evaporative losses and less the cumulative combined flow obligation. The quantity of water available for consumptive use in Utah during this period is 23% of the total amount available to the Upper Basin (after subtracting the fixed 50,000 af/year apportioned to Arizona).

The amount of water available for consumptive use in the States of the Upper Division, and thus in Utah, can only be known exactly at the time of a flow shortfall (Harding, 2019). The time between a reservoir spill[2] and a flow shortfall can range over decades, and it is impossible to predict hydrology over more than a seasonal time frame with useful skill. If the exact amount of water available for consumptive use were known at the time a spill ends, then water rights could be administered in perfect priority to avoid a curtailment but perfect, or even useful foreknowledge is impossible. The event of a flow shortfall is evidence that water rights have not been administered perfectly, and administration of the payback of over-consumption, or of

2. A "spill" as used herein means that the reservoir is full. The infrastructure at Glen Canyon Dam is such that water may be released down the spillways when the reservoir is not full, but in the terminology adopted herein those flows would be considered "releases".

curtailment to maintain flow at Lee Ferry would cause undue harm to senior water rights (Harding, 2019).

3. The Project would not be 100% reliable at the nominal yield.

The Project would be susceptible to curtailment, and the available information suggests that it would be curtailed at a significant frequency, but the DEIS does not address this probability. Without an evaluation of the reliability of the Project, its ability to meet its proposed purpose cannot be evaluated. The DEIS must quantify the reliability of the project in the face of compact curtailments and operation of a drought contingency plan (DCP).

As described above, the Project is susceptible to curtailment under the terms of the CRC and the UCRBC. Curtailment could reduce or even eliminate yield from the project for a year or more. As described below, evidence in the Project documents and the Colorado River Basin Supply and Demand Study (Reclamation, 2012) cited in the DEIS and its supporting documents, suggests that the Project could be curtailed at a significant frequency.

A DCP includes both a Demand Management Storage Agreement (DMSA), allowing for use of unfilled space in federal reservoirs, and demand management programs (DMP) for the Upper and Lower Basins. No Upper Basin DMP currently exists—its feasibility and potential scope is currently the subject of study by at least some states of the Upper Division. Reclamation (2019) contains a conceptual statement of purpose for an Upper Basin DMP.

> "The purpose of an Upper Basin Demand Management Program will be to temporarily reduce Consumptive Uses in the Upper Basin or augment supplies with Imported Water, if needed in times of drought, to help assure continued compliance with Article III of the Colorado River Compact without impairing the right to exercise existing Upper Basin water rights in the future." (Reclamation, 2019)

Augmentation of supplies would be extraordinarily expensive and politically complex and is unlikely to occur. Accordingly, without augmentation the Upper Basin DMP is solely a mechanism for prospective administration of consumptive use, so as to reduce the probability of a shortfall to the combined flow obligation at Lee Ferry. As such, operation of an Upper Basin DMP can be thought of as a pre-emptive curtailment, and diversions by the Project would likely be reduced when the DMP is in operation.

4. In the event of a curtailment, the Project would likely impair senior Utah water rights

As described above, and in Harding (2019), except in extraordinary circumstances, a curtailment will result in impairment of senior rights due to the accumulation of depletions by more junior rights. Because years or decades may pass between curtailments, the effect of excess consumptive use by junior rights accumulates in Lake Powell. If the cumulative over-consumption under a junior right is more than its annual consumptive use, curtailment would extend to senior rights, thus impairing those rights (Harding, 2019).

For illustration, assume that the Project operates at its full annual capacity for ten years, and that it is the most junior water Colorado River water right operating in Utah. Over that time it will deplete about 860,000 af from the Colorado River, and those annual depletions will accumulate in Lake Powell with the result that the reservoir will be 860,000 af lower than if the Project had not been operating. If, at the end of that period Lake Powell is empty, and a shortfall

in the combined flow obligation in the amount of 500,000 af results, that shortfall will be entirely due to operation of the Project over that ten-year period; absent the effect of the project, the reservoir would have been able to release 500,000 af, so no shortfall would have occurred, and still have contents of 360,000 af. But the Project, even if shut down completely, would make up only 86,000 af of that shortfall in one year; the remainder would have to be made up by curtailing other, senior water rights.

Even prospective administration, such as against "triggers" as contemplated by DMPs would likely impair senior rights. Only an after-the-fact settlement may be able to make senior rights whole (Harding, 2019).

5. The Project could cause impacts to Lower Basin water rights

A curtailment is intended to maintain flow at Lee Ferry sufficient to meet the combined flow obligation there. This may not be possible in in very severe conditions, particularly because consumptive use under Present Perfected Rights cannot be curtailed even if that means that the flow at Lee Ferry will drop below the combined flow obligation. In the event that the combined flow obligation at Lee Ferry is not fully met, the amount of water available for storage or use in the Lower Basin would be reduced, potentially impairing water rights there. Shortfalls to the combined flow obligation are possible based on analysis of prehistoric flow reconstructions (Harding, 2019) and will increase in frequency if climate change or megadroughts reduce flows of the Colorado River further.

6. DEIS ignores the effect of climate change on Project yield.

The DEIS adopts projections of hydrologic conditions under five future climate scenarios to show that Washington County Water Conservancy District (WCWCD) would experience 2060 supply deficits ranging from approximately 54,000 af to approximately 113,000 af, or more. These projected deficits are used to establish the need for the project. The project purpose is to supply water to the WCWCD to eliminate or reduce these deficits.

However, the DEIS applies inconsistent analytical approaches for the assessment of need and purpose. In assessing need, the DEIS quantifies the effect of climate change on water supply shortfalls to WCWCD, as noted above, but it ignores the effect of climate change when assessing the ability of the Project to deliver water, and assumes that the nominal annual yield claimed for the Project, 86,249 af, would be available in every year. The very research cited in support of the assessment of need offers a dire picture of future water supply on the Colorado River and suggests that the yield of the project is highly uncertain. Further, the hydrology studies incorporated into the DEIS documents suggest that the yield of the Project would not be reliable.

The DEIS cites recent published research by Udall and Overpeck (2017) and Milly and Dunne (2020) to support projections of lower flows on the Virgin River, and thus larger WCWCD supply shortfalls. However, the results in both Udall and Overpeck and Milly and Dunne encompass the entire Upper Colorado River Basin, and can be directly applied to natural flow at Lee Ferry. Both papers offer estimates of projected change in runoff (directly comparable to change in natural flow at Lee Ferry) due to projected changes in temperature. The expected value of flow changes at 2050 ranged from -7% to -27% for Udall and Overpeck and -14% to -31% for Milly and Dunne. Very roughly speaking, these projections translate to reductions in

water available to Utah of 240 thousand af (kaf) to 1 maf[3]. Both groups of authors state that it is possible that these reductions could be moderated by increases in precipitation, but that it is unlikely that those increases could fully counter the temperature-induced reductions.

Note that these projections are for changes to average flow. Multi-decadal-scale droughts are amply represented in the historical record, and more severe and sustained droughts are contained in the prehistoric record. Drought would compound the flow reductions due to projected changes average temperature. For example, Udall and Overpeck note a 16% reduction in flow during a 25-year drought in the prehistoric record.

7. The DEIS hydrology analyses are not based on sound science and sound assumptions

The DEIS reports results of hydrology modeling on the Colorado River. Two hydrology scenarios are used to generate this result, a historical scenario and a climate change scenario. However, these analyses are unrealistic, as they assume that a substantial part of the expected increase in basinwide consumptive use will not occur. In Appendix C-10 (Reclamation, 2020), Reclamation writes:

> In this modeling, Colorado Basin future total annual depletions are significantly lower than those modeled in the 2012 Basin Study and the 2007 Final EIS of the Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead (Interim Guidelines EIS; Reclamation 2007a). This is because for the purposes of this analysis all depletions except the Southern and Highway Alternatives and those identified as reasonably foreseeable held at 2060 levels were held constant at 2020 depletion levels.

Elsewhere in Appendix C-10 and in the DEIS, Reclamation characterizes this modeling decision as providing "the maximum impact", but this is simply wrong. Each one of the seven Colorado River states plans to utilize fully all water that is physically and legally available to it. No justification is provided for this assumption of reduced basin-wide depletions, but even if one could be offered the assumption is scientifically incorrect and completely implausible, and renders useless the hydrology results on which the DEIS is based.

Reclamation did include a "sensitivity analysis" wherein full basinwide projected demands were used to simulate the Project, but only against the historical inflow scenario. Using the full basinwide projected demands is the correct demand assumption, but that assumption should be used in the main analysis. (The use of the direct natural flows to represent "historical" conditions overstates the performance of the Project, as is described more fully below.)

In the DEIS and in Appendix C-10, it is not clear exactly what depletions from the Colorado River were simulated in modeling the No Action Alternative. See the specific language below.

8. The DEIS does not provide a direct assessment of the reliability of the Project

As described above, the Project will be susceptible to curtailment by operation of the Colorado River Compact and the Upper Colorado River Basin Compact. The DEIS does not

3. Based on a long-term average flow at Lee Ferry of 15 maf. A 7% reduction of 15 maf is 1.05 maf, which would be borne by the Upper Division states. Utah is apportioned 23% of the water available to the Upper Division states; its share of the 7% reduction is thus about 240,000 af.

report, as part of its hydrology analyses, results that allow a direct assessment of the reliability of the Project. What is necessary are estimates of the frequency and severity of curtailments. A presentation of results that would provide this information would be a set of curves of the magnitude of 10-year cumulative flows at Lee Ferry, for the 10th, 5th and 2nd percentile (corresponding to return intervals of 10, 20 and 50 years)[4].

9. What other DEIS hydrology analyses suggest about Project reliability

Three analyses of the water supply for the Project from the Colorado River are available: the presumably final analysis in Appendix C-10; Final Study Report 18, Surface Water Resources, dated April 2016; and Draft Study Report 18, Surface Water Resources, dated November, 2015. Each provides information beyond what is contained in the DEIS itself.

9.1. Appendix C-10: Hydrology

This analysis is the source of three charts presented in the DEIS showing model results for Lake Powell water surface elevation (WSE) in December. Very important modeling results were provided in Appendix C-10 but not included or even mentioned in the DEIS. In addition to the December WSE results, Appendix C-10 provides results for the probability that Lake Powell would fall below minimum power pool, and water-year release volume from Glen Canyon Dam. In addition, Appendix C-10 presents results for another scenario using a conventional assumption of full development in the Upper Basin[5] and the climate change hydrology. Results for that scenario are shown in the following figures.

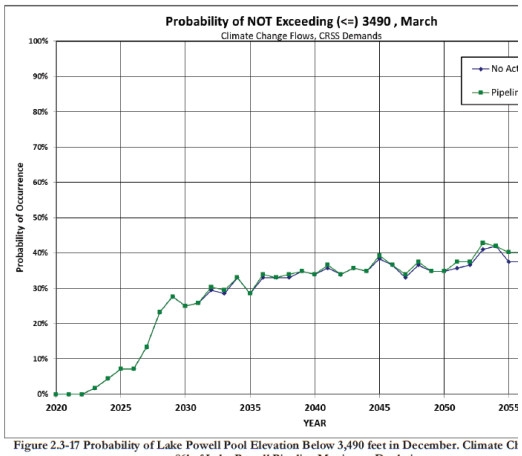


Figure 2.3-17 Probability of Lake Powell Pool Elevation Below 3,490 feet in December. Climate Cl
86kaf Lake Powell Pipeline Maximum Depletion.

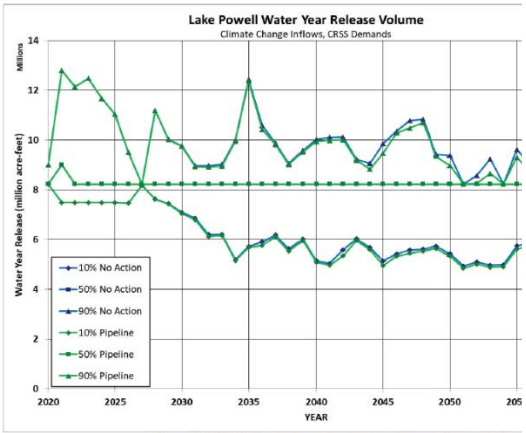


Figure 2.3-18 Lake Powell Water Year Release. Climate Change Inflow
86kaf Lake Powell Pipeline Maximum Depletion.

Figure 2.3-17 (left) shows the probability of not exceeding the WSE of minimum power pool in Lake Powell (3,490 ft). Minimum power pool is the elevation at which generation at the hydroelectric plant at Glen Canyon Dam must cease, causing severe operational and financial impacts. A primary objective of an eventual Upper Basin DMP would be to maintain Lake Powell at or above minimum power pool. Figure 2.3-17 shows that the probability that Lake Powell would be at or below minimum power pool increases with time, and reaches 40% at 2060. Demand management practices (e.g. fallowing) act slowly, over a year or more, so this

4. This would be similar to Figure 2.3-9 of Appendix C-10, Hydrology, but for the ten-year cumulative flow and for at least the three percentiles noted.
5. Virtually every previous study of water availability in the Colorado River has included evaluation of what is termed "full development" in the Upper Basin. See, for example, Reclamation, 2007 and Reclamation, 2012.

result suggests that an Upper Basin DMP would have to be active at all times, so the yield of the Project would likely be substantially reduced.[6]

Figure 2.3-18 (right) shows the distribution of releases from Lake Powell during the study period. Of interest is the lower set of lines—releases from Lake Powell (through Glen Canyon Dam) were simulated to be at or below the levels shown in those lines ten percent of the time. (For example, in 2043, the simulation shows that in both the No Action and Pipeline cases the annual release would be less than or equal to 6 maf.) Under normal operations, an annual release of 8.23 maf from Glen Canyon Dam is considered sufficient to meet the combined flow obligation at Lee Ferry[7] and this is the usual operation. Releases below this level will lead to a flow shortfall to the combined flow obligation at Lee Ferry, which would precipitate a curtailment. Even a single year of low flow could cause a curtailment if the release over the previous nine years has been at the nominal level of 8.23 maf. Figure 2.3-18 shows that after about 2032 there would be a 10% probability that releases would be at or below 5 to 6 maf. These results suggest that the Project could be susceptible to curtailment one out of every ten years, on average.

Appendix C-10 adopted the same assumption about future basinwide depletions as the DEIS:

> Those depletions that cannot be defined as reasonably foreseeable remained constant at the 2020 depletion levels associated with the Basin Study Current Projected demand scenario. Those depletions assumed reasonably foreseeable are held constant at 2060 levels, and include the Central Utah Project, Animas-La Plata, Dolores Project, Navajo-Gallup, Ute Indian Compact, and Navajo Indian Irrigation Project.

Appendix C-10 describes the No Action Alternative this way:

> Under the No Action Alternative, the LPP would not be built and no other planned projects described in the No Action Alternative in Chapter 2 of this DEIS would affect the Colorado River. Therefore, there would be no effect to the Colorado River under this alternative.

Without a detailed report of the modeled depletions the disposition of the Colorado River supply for Project in the No Action Alternative is uncertain. A comparison of DEIS Figure 3.8.1, Appendix C-10 Figure 2.3-1 and Final Study Report 18 Figure 1 show similar differences between the Action and No Action alternatives, which implies that Appendix C-10 and the DEIS assumed that the water supply for the Project would not be developed elsewhere by Utah under the No Action alternative. The relatively small, and increasing magnitude of the differences between the Action and No Action alternatives in this modeling is attributable to the transient

6. The agreement about Colorado River drought contingency management, Reclamation, 2019, sets a target level of 3,525 ft as the elevation when actions will be contemplated to protect against excessively low levels in Lake Powell. While this is an operational target, it illustrates that action will be contemplated well before the Reservoir approaches minimum power pool. This provides a perspective on the degree of conservatism that can reasonably be expected in an Upper Basin DMP.

7. The combined flow obligation at Lee Ferry is assumed to be met if the flow at Lee Ferry is 8.25 maf annually, as this will provide 75 maf over a ten year period to meet the CRC Article III(d) obligation and 0.75 maf annually to meet the assumed Upper Division share of the federal obligation to Mexico. The Paria River joins the Colorado River between Glen Canyon Dam and Lee Ferry and contributes an annual average of 20,000 af (0.02 maf). Thus, the usual operation at Glen Canyon Dam is an annual release of 8.23 maf. Higher or lower releases are made under specific conditions.

nature of the analysis and its arbitrary stopping point in 2060. This is only an inference, however—this imprecision in the DEIS prevents an assessment of the impacts of the Project.

9.2. Final Study Report 18, Surface Water Resources

Final Study Report 18 (UBWR, 2016) is based on hydrologic modeling conducted by Reclamation (Reclamation, 2015) included therein as Attachment 2, DRAFT Lake Powell Pipeline Hydrologic Modeling. The approach and results in Reclamation, 2015 are consistent with but not identical to results in Appendix C-10 and the DEIS. One difference in approach is that depletions that are not considered "reasonably foreseeable" are held at 2015 levels.

Reclamation, 2015 is explicit about whether water contemplated for diversion by the Project is assumed to be used elsewhere in Utah. It describes the No Action alternative this way.

> The No Action alternative assumes that if the Lake Powell Pipeline is not developed, Utah's unallocated water would not be developed somewhere else in the state. This analysis isolates the effect of adding a new project (Lake Powell Pipeline) to the mix of existing and reasonably foreseeable depletions in the Colorado River system.

9.3. Draft Study Report 18, Surface Water Resources

Draft Study Report 18 (UBWR, 2015) is based on hydrologic modeling conducted by Reclamation (Reclamation, 2010) included therein as Attachment 2, DRAFT Lake Powell Pipeline Hydrologic Modeling. Reclamation, 2010 differs in substantial ways from the subsequent reports described above.

It adopted two scenarios of future basinwide depletions, each with different assumptions about the No Action alternative:

- Final Planning Analysis: Assumes that future water development in the Upper Colorado River Basin would occur according to projections provided by the Upper Basin States. In this analysis the No Action alternative assumes that if Utah does not develop the Lake Powell Pipeline, that water *would* be developed somewhere else in the state.
- No Additional Depletion Analysis: Assumes water use in the Colorado River basin would remain constant at current levels, except for reasonably foreseeable future projects, which are held constant at 2009 depletion levels. In this analysis, the No Action alternative assumes that if the Lake Powell Pipeline is not developed, that water *would not* be developed somewhere else in the state.

As explained below, the No Additional Depletion scenario is not plausible and is not considered further here.

Reclamation, 2010 adopted two scenarios of future hydrology:

- Direct Natural Flow, Index Sequential Method (ISM): The future hydrology used as input to the model in this scenario consisted of samples taken from the historic record of natural flow in the river system over the 101-year period from 1906 through 2006.
- Nonparametric Paleo-conditioned (NPC) inflows: This inflow hydrology scenario uses paleo-hydrologic state information (i.e., wet or dry) to conditionally sample from the historic natural flow record. The paleo-hydrologic state information was derived from

annual streamflow reconstructions from tree-ring chronologies of the years 762 to 2005 on the Colorado River at Lees Ferry (Meko *et al.,* 2007).

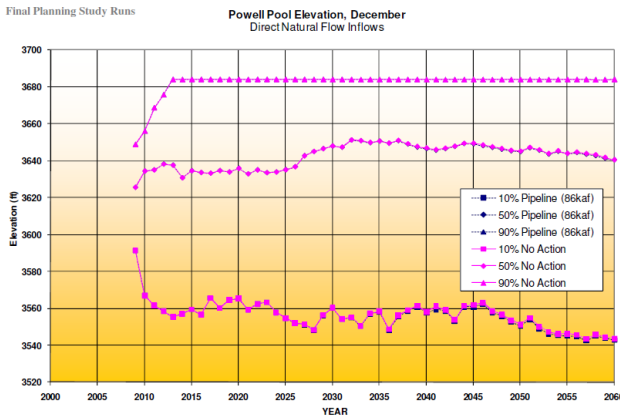
See Reclamation (2007) for details of the Index Sequential Method (Chapter 4) and the Non-Parametric Paleo-conditioned method (Appendix N).

The most notable result from Reclamation 2010 is the substantial difference in simulated Project performance between model runs using the ISM and the NPC hydrology, as shown in the following figures ("Selected results…"). The first row shows Figure 1 (left, based on direct natural flows, DNF/ISM) and Figure 7 (right, based on NPC) from Reclamation, 2010. These two figures show estimates of the future probability of Lake Powell WSE. Note that the two figures have very different vertical axes.

Selected results from Reclamation, 2010 (Draft Study Report 18, Surface Water Resources, Attachment 2)

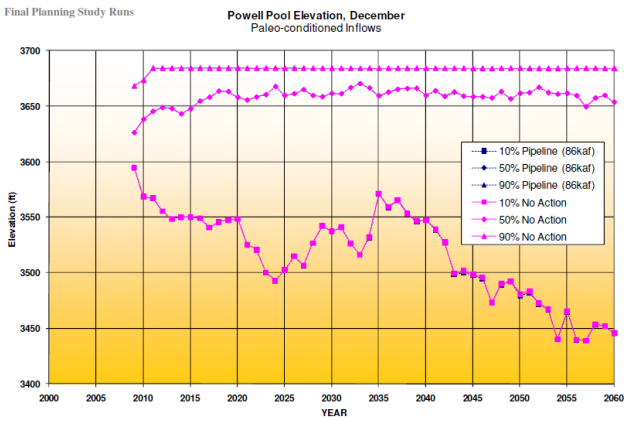
Results based on Direct Natural Flows (ISM)

Results based on paleo-conditioned flows (NPC)



Lake Powell Pool Elevation, December. Direct natural flow inflows, 86kaf Lake Powell Pipeline maximum depletion.

Figure 1



Lake Powell Pool Elevation, December. Paleo-conditioned inflows, 86kaf Lake Powell Pipeline max depletion.

Figure 7

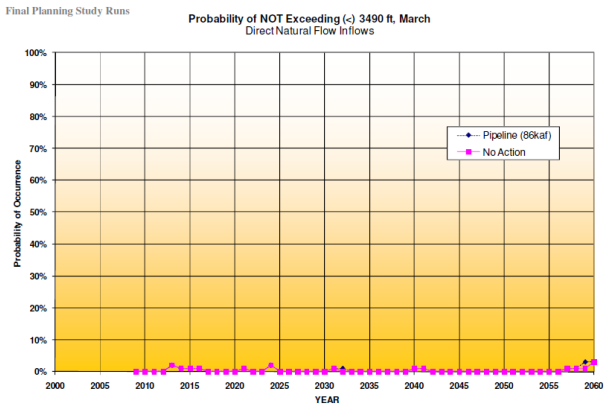


Figure 2. Probability of Lake Powell pool elevation being below 3490 ft in March. Direct natural flow inflows, 86kaf Lake Powell Pipeline maximum depletion.

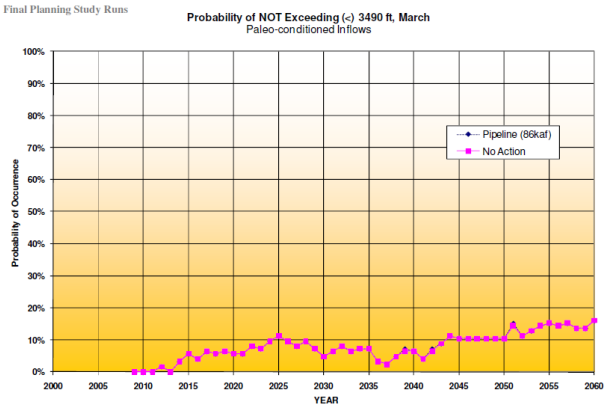
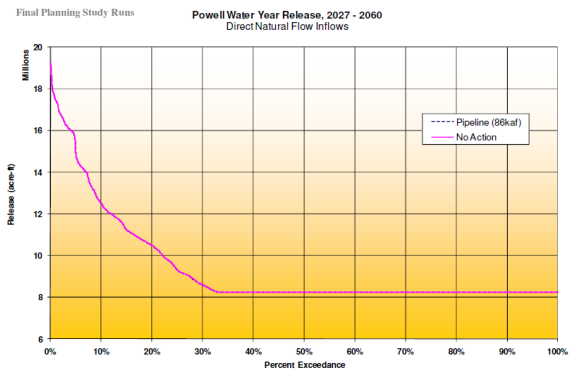
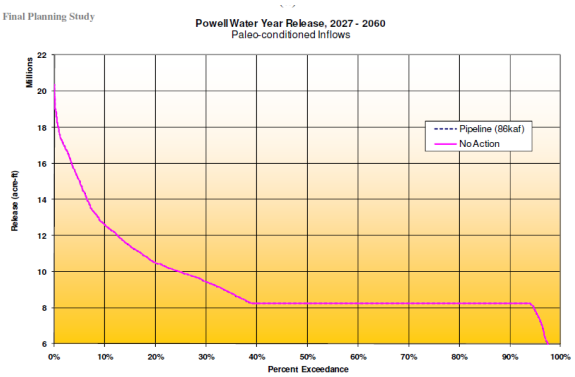


Figure 8. Probability of Lake Powell pool elevation being below 3490 ft in March. Paleo-conditioned inflows, 86kaf Lake Powell Pipeline max depletion.



(b)

Figure 4. Lake Powell water year release, flow duration curve throughout time during the Interim Guidelines period (a) and during the post-Interim Guidelines period (b). Direct natural flow inflows, 86kaf Lake Powell Pipeline maximum depletion.



(b)

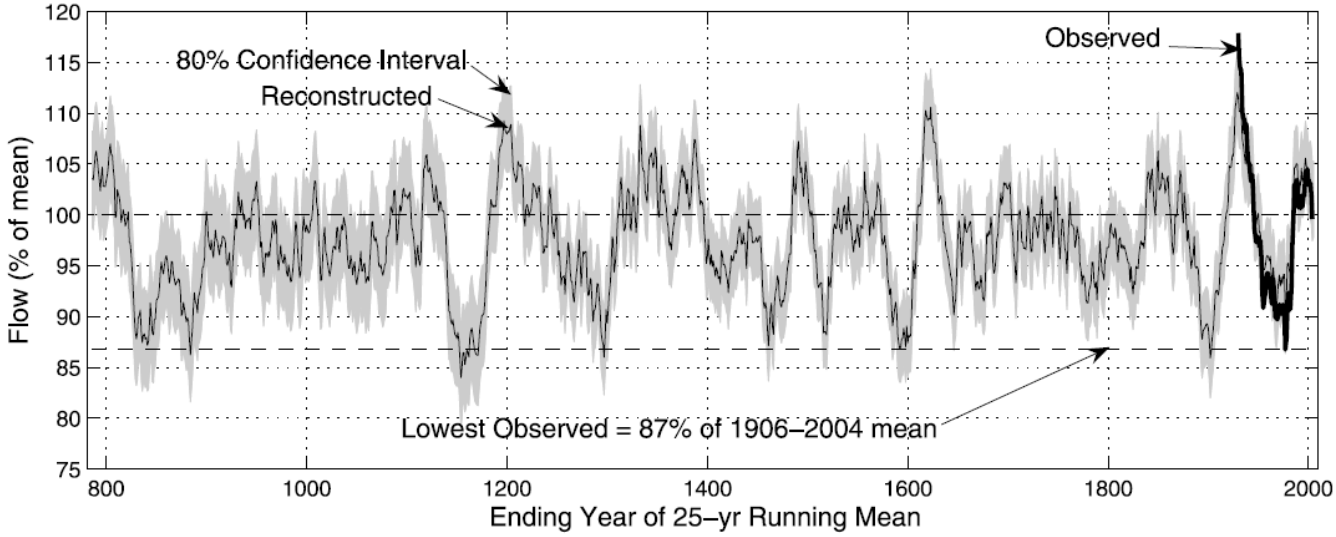
Figure 10. Lake Powell water year release, flow duration curve throughout time during the Interim Guidelines period (a) and during the post-Interim Guidelines period (b). Paleo-conditioned inflows, 86kaf Lake Powell Pipeline maximum depletion.

The 10th percentile WSE for the NPC scenario decreases dramatically after 2035, falls below minimum power pool in about 2050, and is decreasing when the analysis ends in 2060. The second row shows the probability that Lake Powell WSE would fall to or below minimum power pool. Figure 8 (right, NPC) shows the probability that Lake Powell WSE would fall to or below minimum power pool to be about 10% by 2045 (one out of every ten years) and 15% by 2060 (approximately one out of every seven years; the corresponding probability in Figure 2 (left, DNF/ISM) is virtually zero. The third row shows the cumulative distribution of annual water-year releases from Glen Canyon Dam. Figure 10 (right, NPC) shows the probability that Glen Canyon water-year releases would fall below 8.23 MAF to be about 5% (approximately 1 in every 20 years); the corresponding probability in Figure 4 (left, DNF/ISM) is zero (flows are at or above 8.23 MAF 100% of the time). Note that lowest value shown on the vertical axis of Figure 4 is 6 MAF and flows reach that level, or below, three percent of the time.

The results from the NPC analysis suggest that the Project would be vulnerable to reductions or elimination of yield due to operation of DCP/DMP or due to curtailment. The tenth percentile of Lake Powell WSE (first row, right) drops steadily after 2035 and drops below minimum power pool around 2050. The tenth percentile value is the elevation at which the reservoir will be *at or below* one year out of ten, on average. That the tenth percentile WSE is dropping in 2060 is an indication that the system is not sustainable and that the study period must be extended to adequately characterize the long-term performance and reliability of the Project. The probability of not exceeding minimum power pool (WSE of 3490 ft; second row, right) rises above 10% before 2045, reaches about 15% in 2055 and is still increasing in 2060. This result is consistent with Figure 7. The frequency distribution of water year releases from Glen Canyon Dam (third row, right) drops below the normal annual release of 8.23 maf about 5% of the time. This is equivalent to a flow shortfall in one out of every 20 years.

The differences between the results from the DNF and NPC scenarios are due to the peculiar nature of the historical record. The natural flow record on the Colorado River begins in 1906 and from that time until the 1920's the river enjoyed a sustained wet period. The ISM method steps through the historical hydrology record (101 years long, at the time of these analyses), first starting a simulation in 1906 that runs until 2006, then starting a second simulation that runs from 1907 through 2006 and then wraps around and includes 1906, and so on. This produces 101 separate simulations, the last one starting in 2006 and then wrapping

around to pick up 1906 through 2005. However, each of the 101 simulations includes the wet period in the first part of the 20th Centurym, but that wet period was a very rare event—it is singular in the reconstructed period reaching back to year 762. Figure 2 from Meko *et al.*, 2007 illustrates this.



The Meko *et al.*, 2007 reconstructed record indicates that the early 20th Century wet period is wettest period in more than 1,200 years. Assuming only for illustration that the climate over the next 1,200 years would remain the same as it was in the last 1,200 years, then we could expect to see one wet period equivalent to that of the early 20th Century over that 1,000-year period. But, *each* of the 101 simulations from the DNF/ISM hydrology contains that wet period as one or two wet spells. This introduces a non-conservative bias into the evaluation of the performance and impacts of the Project. On the other hand, the NPC hydrology preserves the mean flow from the historical record within a few percent but generates many unique synthetic flow sequences that are consistent with the variability shown in the Meko *et al.*, 2007 reconstruction. Because it was a very rare event, the NPC flow sequences do not contain a wet spell comparable to the early 20th Century. For this reason, the NPC method is the scientifically sound approach to evaluate the performance and impacts of the project under the current climate.[8]

9.4. The DEIS hydrology studies adopted assumptions and methods that overestimate reliability of the Project

9.4.1. Understating basin-wide depletions

The DEIS bases its assessment of the benefits and impacts of the Project on an analysis that does not reflect full development of all basin states. It offers a "sensitivity analysis" that does reflect full development as an ancillary analysis but that is actually the more appropriate analysis. The assumption in the DEIS that full development would not take place is simply not plausible and constitutes an egregious error in the analysis of the performance and impacts of the Project. This assumption evaluates the Project in the context of a system where there is less

8. The NPC does not reflect the future impact of climate change on the flows of the Colorado River. Rather, it provides a less-biased representation of the past long-term variability of the flow of the Colorado River.

competition for water than is plausible, so the Project will appear to be more reliable and to have less impact than would likely be the true case.

Beyond that bias, the DEIS does not quantify the degree to which basin-wide depletions have been underestimated. The hydrology studies do provide a list of the model "nodes"[9] that have been included in the analysis, but to quantify the degree to which the decision to exclude other expected depletions has understated future basin-wide development would require a high degree of expertise and access to the Reclamation models and datasets. While this is surely possible, the DEIS is deficient because it conceals this important information from the general public.

The DEIS rationalizes its assumption of less-than-full development on a narrow technical interpretation of what projects are "reasonably foreseeable". Even though the development of an individual project may be uncertain, and therefore it is judged not to be "reasonably foreseeable", full development by each Upper Division state of its available water supply is inevitable. Because the impact of any individual project on the water balance above Lee Ferry depends primarily on its consumptive use of water, and not on its location or other details, generic "placeholder" projects should be used to provide a realistic context for evaluation of the Project.

9.4.2. Use of DNF/ISM method

As noted above, the ISM method used to construct the flow sequences used as input in modeling of the Direct Natural Flow scenario always includes the anomalous wet period from the early 20th Century (Meko *et al*, 2007) so it overstates the reliability of the project because Lake Powell fills completely at least once in every trace. The NPC hydrology provides a better foundation for evaluating the performance of the project under an assumption of climate stationarity (i.e. an assumption that the future climate will be similar to that of the past 1,200 years).

9.4.3. Using transient climate-change analysis through 2060 overstates reliability of project

Reclamation consistently uses direct simulation of projected future natural flows based on future climate conditions projected by global climate models (GCMs; also called general circulation models) that are converted into natural inflows using a hydrology model; see Reclamation, 2012. This methodological choice overstates the performance (reliability) of the project for two reasons.

The first reason is related to the short study period used in the DEIS hydrology analyses, all of which end in 2060. The development plan for the Project does not have it begin diversions until 2027 and then depletions start at low levels and increase only gradually and do not reach full yield until 2049, so the Project's full impact is only simulated for eleven years. Projected changes in natural flow develop progressively throughout this century, with conditions at mid-century being substantially less severe than conditions at the end of the century (see, e.g., Harding *et al.*, 2012). Thus, the performance of the Project is being evaluated over a very short period that is not representative of the conditions that are projected to occur during the substantial majority of its service life. A proper evaluation of the reliability and impacts of the Project would use a "period-change" approach (Brekke, 2011) with a simulation period

9. These are locations where depletions are simulated to occur in the Colorado Rivers Simulation System (CRSS) Model used by Reclamation.

extending for at least the expected service life of the project after full development. The period change approach adjusts historical stream flows to reflect the projected average conditions at some future time. The period change approach has been used in numerous studies, including the Colorado River Water Availability Study (CWCB, 2012) and several studies by Reclamation: the St. Mary-Milk Basin Study (Reclamation 2010a), a yield study of selected reservoirs in Oklahoma (Reclamation 2010b), and the Northwest Area Water Supply Project, in North Dakota (Reclamation 2012a). The use of the period change approach has precedence in the DEIS as it was used in the Virgin River Climate Change Analysis as part of the "period composite delta" method (Reclamation, 2014; UBWR, 2016a). An appropriate future time frame for this analysis would be, at a minimum, at the mid-point of the expected service life of the project, but a more conservative choice would be at the end of its expected service life.

The second reason is that the current climate models understate decadal to multi-decadal (D2M) variability in precipitation in historical simulations of the climate of the Western United States, and elsewhere (Ault *et al.*, 2012). It is precisely D2M variability that is most critical for the performance of Lake Powell in the Upper Colorado River Basin. Paleo studies (such as the Meko, *et al.*, 2007 reconstruction) indicate that estimates of D2M prominence based only on the 20th century record may themselves understate the long-term condition. Thus, a future expectation of more severe and sustained drought overlaid on top of changes in mean hydrology is supported by research. The DEIS analysis does not adequately incorporate the current, accepted science about this issue.

10. Reclamation 2012 Supply & Demand Study suggests the Project would have poor reliability

The DEIS refers to Reclamation's 2012 Supply and Demand Basin Study (2012 Basin Study; Reclamation, 2012) to support the statement of need for the Project. Specifically, the DEIS cites to Reclamation, 2012 to rationalize the argument that in the face of climate change WCWCD should have a second source of water. However, the DEIS notably ignores the large body of results in Reclamation, 2012 that quantify the likely effect of climate change to reduce water availability from the Colorado River.

10.1. Reported curtailment frequency, volume

The 2012 Basin Study offers quantitative estimates of the frequency and severity of flow shortfalls at Lee Ferry. (Reclamation, 2012, Figure G-5.) Such flow shortfalls trigger curtailments of consumptive use in the States of the Upper Division. These results suggest that the reliability of the Project would be significantly less than 100%: After about 2040, the frequency of years with flow shortfalls in climate change scenarios range from about 17% to about 25% (roughly, on average, every fifth year) depending on the development scenario. The NPC scenario results in between 2% and 8% (roughly, on average, every 50th to every 12th year) depending on the development scenario. The distribution of the severity of curtailments is generally not influenced by the supply or development scenario: If there is a deficit, 10% of the time it wouldn't exceed 500,000 AF, 50% of the time it wouldn't exceed 2 MAF and 90% of the time it would not exceed 3.5 MAF. Conversely, 10% of the time the magnitude of the curtailment will exceed 3.5 maf. Any deficit would require repayment of overdrafts or curtailment of like amounts of consumptive use in the Upper Division. Multiply the basin-wide deficit by 23% (Utah's share under the UCRBC) to get a rough magnitude for Utah's share of a curtailment. As described below, the flow shortfalls at Lee Ferry, and therefore the volume of

projected curtailments, from Reclamation, 2012, are understated due to omission of the Upper Division obligation to supply a share of the federal Mexico Treaty obligation.

10.2. Methodological shortcomings in the 2012 Supply & Demand Study

The 2012 Basin Study adopted methodological choices that understate the frequency, duration and magnitude of flow shortfalls and thus curtailments. Like the hydrology analyses for the DEIS, the 2012 Basin Study also uses a transient analysis framework and direct simulation of hydrology time series based on GCM outputs. As noted above (Section 8.4.3), these choices reduce the apparent hydrological stress on Lake Powell and therefore understate the frequency, severity and duration of flow shortfalls.

A more significant shortcoming is that the 2012 Basin Study uses a non-depletion flow obligation at Lee Ferry of 75 MAF over ten years. The conventional assumption used in most analyses by Reclamation, and that is incorporated into the operating rules for Lake Powell, is that under most conditions the minimum release from Glen Canyon dam will be 8.23 maf, which is sufficient to provide an annual flow at Lee Ferry of 8.25 maf, which in turn is sufficient to meet the non-depletion obligation in CRC Article III(d) (75 maf over ten years) and an assumed equal share of the federal obligation to Mexico (0.75 maf, annually). See Section 2.1, above for context. The assumption of a ten-year flow obligation of 75 maf at Lee Ferry in Reclamation, 2012 ignores the obligation of the Upper Division to contribute some share to the federal Mexico Treaty delivery obligation (Reclamation, 2012c, Chapter 5). How that share will be quantified is in dispute, but there is no plausible argument that it will be zero; the conventional assumption is that the Upper Division will be required to deliver 0.75 maf (one-half of the federal Mexico Treaty obligation) each year at Lee Ferry. Thus, the modeling conducted in Reclamation, 2012, understates the amount of water that must be released from Lake Powell by 7.5 maf over every ten-year period. This results in a low bias in estimates of both frequency and severity of curtailments.

References

Ault, T.R., Cole, J.E. and S. St. George. 2012. The amplitude of decadal to multidecadal variability in precipitation simulated by state-of-the-art climate models. Geophysical Research Letters, VOL. 39, L21705, doi:10.1029/2012GL053424, 2012

Brekke, L. 2011. Addressing Climate Change in Long-Term Water Resources Planning and Management: User Needs for Improving Tools and Information U.S. Army Corps of Engineers Civil Works Technical Series CWTS-10-02. Bureau of Reclamation, Technical Service Center, Denver, Colorado. 2011.

Castle, A. and Fleck, J. 2019. The Risk of Curtailment under the Colorado River Compact. Available at SSRN: https://ssrn.com/abstract=3483654 or http://dx.doi.org/10.2139/ssrn.3483654. November 8, 2019.

Colorado River Compact, November 24, 1922. COLO. REV. STAT. § 37-61-101 (2012). (CRC; See Nathanson, 1978.)Harding, B. 2019. Reservoir memory complicates water management in the Upper Colorado River Basin. https://papers.ssrn.com/abstract=3480751. Lynker Technologies, LLC. November 4, 2019.

Colorado River Governance Initiative (CRGI). 2010. Rethinking the Future of the Colorado River: Draft Interim Report of the Colorado River Governance Initiative. December, 2010.

Colorado Water Conservation Board (CWCB). 2012. "Colorado River Water Availability Study." Colorado Water Conservation Board. https://dnrweblink.state.co.us/cwcb/0/doc/158319/Electronic.aspx?searchid=78f0eafa-0b8f-4d8a-9ff3-faf67cc82f52.

Harding, B.L. 2019. Reservoir Memory Complicates Water Management in the Upper Colorado River Basin. Lynker Technologies, LLC WORKING PAPER SERIES, November 4, 2019. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3480751

Harding BL, Wood AW, Prairie JR. 2012. The implications of climate change scenario selection for future streamflow projection in the Upper Colorado River Basin. Hydrol Earth Syst Sci Discuss 16: 3989–4007.

Kuhn, E. and Fleck, J. 2019. Science Be Dammed: How Ignoring Inconvenient Science Drained the Colorado River Tucson: University of Arizona Press. 288 pages.

MacDonnell, L., D.H. Getches, and W.C. Hugenberg Jr. 1995. *The Law of the Colorado River: Coping with Severe Sustained Drought*. Water Resources Bulletin, 31:5(825-836), October.

Meko, David M., Connie A. Woodhouse, Christopher A. Baisan, Troy Knight, Jeffrey J. Lukas, Malcolm K. Hughes, and Matthew W. Salzer. 2007. "Medieval Drought in the Upper Colorado River Basin." Geophysical Research Letters 34 (10). https://doi.org/10.1029/2007GL029988.

Mexican Water Treaty, 1944. *Treaty on Utilization of the Waters of the Colorado and Tijuana Rivers and of the Rio Grande*, February 3, 1944, U.S. Government Printing Office, Treaty Series 994. (See Nathanson, 1978.)

Milly, P.C.D. and Dunne, K.A. 2020. Colorado River flow dwindles as warming-driven loss of reflective snow energizes evaporation. Science 367 (6483), 1252-1255. DOI: 10.1126/science.aay9187

Nathanson, M.N. 1978. Updating the Hoover Dam Documents. United States Department of the Interior Bureau of Reclamation. U.S. Government Printing Office, Denver, Colorado, 1980.

Reclamation, 1970. Criteria for Coordinated Long-Range Operation of Colorado River Reservoirs. June, 1970.

Reclamation. 2007. Final EIS – Colorado River Interim Guidelines for Lower Basin Shortages and Coordinated Operations for Lake Powell and Lake Mead. U.S. Department of the Interior, Bureau of Reclamation, Upper and Lower Colorado Regions. https://www.usbr.gov/lc/region/programs/strategies /FEIS/index.html. October, 2007.

Reclamation. 2010. DRAFT Lake Powell Pipeline Hydrologic Modeling, Final Planning Study Analysis. Appendix 2 of UBWR, 2015. U.S. Department of the Interior, Bureau of Reclamation. March 9, 2010.

Reclamation. 2010a. Climate Change Analysis for the St. Mary and Milk River Systems in Montana, prepared by the U.S. Department of the Interior, Bureau of Reclamation, Technical Services Center, Denver, Colorado, August 2010. 35 pp.

Reclamation. 2010b. Climate Change and Hydrology Scenarios for Oklahoma Yield Studies, prepared by the U.S. Department of the Interior, Bureau of Reclamation, Technical Services Center, Denver, Colorado, April 2010. 71 pp.

Reclamation. 2012. Colorado River Basin Water Supply and Demand Study. Final Study Report. https://www.usbr.gov/lc/region/programs/crbstudy/finalreport/studyrpt.html. U.S. Department of the Interior, Bureau of Reclamation. 2012.

Reclamation 2012a. Climate Change Analysis for the Missouri River Basin Northwest Area Water Supply Project, North Dakota Technical Memorandum No. 86-68210-2012-03. Technical Service Center, Denver, Colorado, July 2012. 31 pp.

Reclamation. 2014. Virgin River Climate Change Analysis Statistical Analysis of Streamflow Projections. March 26, 2014.

Reclamation. 2015. DRAFT Lake Powell Pipeline Hydrologic Modeling. Appendix 2 of UBWR, 2016. U.S. Department of the Interior, Bureau of Reclamation. September 14, 2015.

Reclamation. 2019. Agreement Concerning Colorado River Drought Contingency Management and Operations, Attachment A1: Agreement for Drought Response Operations at the Initial Units Of The Colorado River Storage Project Act, https://www.usbr.gov/dcp/docs/final/Attachment-A2-Drought-Managment-Storage-Agreement-Final.pdf. U.S. Department of the Interior, Bureau of Reclamation. May 20, 2019.

Reclamation. 2020. Lake Powell Pipeline Project, Draft Environmental Impact, Statement, Coconino and Mohave Counties, Arizona, Kane and Washington Counties, Utah. U.S. Department of the Interior, Bureau of Reclamation. June 2020.

Reclamation. 2020a. Lake Powell Pipeline Project, Appendix C-10: Hydrology, Coconino and Mohave Counties, Arizona, Kane and Washington Counties, Utah. U.S. Department of the Interior, Bureau of Reclamation. June 2020.

UBWR. 2016. Lake Powell Pipeline Project, Final Study Report 18, Surface Water Resources. Utah Board of Water Resources. April 2016

UBWR. 2016a. Lake Powell Pipeline, Final Study Report 19. Climate Change. Utah Board of Water Resources. April 2016

UBWR. 2015. Lake Powell Pipeline Project, Draft Study Report 18, Surface Water Resources. Utah Board of Water Resources. November 30, 2015.

Udall, B., and J. T. Overpeck. 2017: The twenty-first century Colorado River hot drought and implications for the future. Water Resour. Res., 53, 2404–2418, doi:https://doi.org/10.1002/2016WR019638.

Upper Colorado River Basin Compact, October 11, 1948. (UCRBC; See Nathanson, 1978.)

Utah Code Ann. §73-3-21.1. https://le.utah.gov/xcode/Title73/Chapter3/73-3-S21.1.html

Verburg, K. O. 2010. The Colorado River Documents 2008. U.S. Department of the Interior, Bureau of Reclamation, Lower Colorado River Region. September 2010

Weisheit, J. 2019. The Hoover Dam Documents. http://www.onthecolorado.com/articles.cfm?mode=detail&id=1292710182151 Accessed September 22, 2019.

Wilbur, R. L., Ely, N. 1933. The Hoover Dam Power and Water Contracts and Related Data. United States Department of the Interior, United States Government Printing Office. Washington, D.C. 1933.

Wilbur, R. L., Ely, N. 1948. The Hoover Dam Documents. 80th Congress 2nd Session, House Document No. 717. United States Government Printing Office. Washington, D.C. 1948.

Appendix D. Water DM Analysis of Water Demand, September 4, 2020

September 4, 2020

Conserve Southwest Utah
321 North Mall Drive, B202
St George, UT 84790

Expert opinion and analysis regarding water demands and statement of need for the Lake Powell Pipeline Project DEIS

To Whom It May Concern:

At the request of Conserve Southwest Utah, I have prepared this expert letter report regarding water demands pertaining to the Lake Powell Pipeline (LPP) Project Draft Environmental Impact Statement (DEIS) and statement of Purpose and Need (Appendix B).

In summary, this letter report concludes that the future water demand forecast for Washington County is grossly inflated. The forecast is inflated through several mechanisms including:

- A population forecast that increases by 293%.
- An excessive level of per capita water use that would make Washington County water users among the highest in the US.
- Improper inclusion and inflation of raw secondary irrigation water in the forecast.
- A 15.4% water loss factor that never improves and thus wastes approximately $300 million in value of the $2 billion-dollar project.

A statement of need and water demand forecast for a project of this size and scope must be based on sound data, reasonable assumptions, and conservative resource principles to ensure the water will not be wasted. Water customers across the Western United States have successfully implemented effective water efficiency strategies that today have reduced per capita use far below levels shown the DEIS forecast for 2020 and 2075. The forecast in the DEIS provides for an excessive level of per capita water use over the next 55 years with efficiency improvements that simply end at year 2045 with no further improvement in efficiency achieved over the next 30 years. This is neither realistic nor reasonable.

The DEIS forecasts a future population of more than 500,000 people, which is equivalent to a city the size of Tucson, Arizona. With this level of development, current housing patterns will change and fewer people are likely to live in large sprawling single-family homes with a supply

of secondary water for irrigation as is common today. Under this high growth scenario, water use will necessarily change and become more efficient. The DEIS forecast should reflect realistic, efficient levels of future use, not wasteful and excessive levels as currently presented.

Arguments that Washington County is somehow different or exceptional from other communities in the West because it has second homes, resorts, pools, golf courses, and such and is thus immune to national trends towards higher efficient water use are nonsense. Water is a precious and expensive commodity and least cost planning principles must be applied when considering expensive infrastructure projects such as the Lake Powell Pipeline.

Water in Washington County will be expensive in the future, regardless of the source, and economics alone will press down demand. New technology for remotely managing irrigation and for detecting both utility and customer water leaks will reduce demands and losses in the future, something ignored in the DEIS forecast. Communities across the Western US, including Aspen, Las Vegas, and Tucson - with many second homes and traditionally high irrigation demand - have successfully reduced both indoor and outdoor water use to levels today that are far below what is forecast in the DEIS for year 2075.

For the past 30 years water demand forecasts prepared by utilities have grossly over-estimated water demands because they ignore the impacts of water efficiency and conservation. The demand forecast in the DEIS makes the same mistake and is inflated and unrealistic. The DEIS forecast ignores obvious trends in usage and future technological improvements as well as economic pressures that have reduced demand and will continue to do so, because water is such a precious commodity.

This report provides a detailed review and analysis of each component of the DEIS demand forecast and shows how it compares with current water use in other communities across the Western US. The analysis in this report shows that the DEIS forecast is highly inflated and likely unrealistic. Even if this exceptional (and highly unlikely) level of population growth were to occur in the southern Utah desert, the water demands required to serve these people have been improperly inflated though several mechanisms. The proposed future level of per capita water use and water loss are excessive and ignore today's best practices regarding the ongoing impact of water efficiency.

Summary of Qualifications

I am the Principal of Water Demand Management, LLC (WaterDM), based in Boulder, Colorado. WaterDM is a water consulting firm providing expertise and services in the following areas:

- Municipal and industrial water use, research, and analysis
- Water conservation and demand management planning and implementation
- Integrated water resources planning
- Water loss control
- Analysis of municipal water rates and rate structures
- Drought preparedness and response
- Demand forecasting
- Evaluation of changes in demand

- Statistical analysis of water demand and modeling
- Meter technology implementation
- Meter and service line sizing

I have a Master of Science in Engineering (1995) from the University of Colorado, Boulder and a Bachelor of Arts (1986) from Oberlin College. I am a registered and licensed Professional Engineer in Colorado.

I am a civil engineer and the focus of my career for over 25 years has been on urban water systems and demand management including conservation planning and implementation, rate analysis, water demand research, demand forecasting, drought preparation, utility metering, and water loss control. Since 1995, I have served as a consultant and researcher to urban water providers, US EPA, the Water Research Foundation, the Alliance for Water Efficiency, state governments, and municipal and industrial water users in the US and Canada.

Over my 25 -year engineering and consulting career, I have worked with and advised hundreds of water providers and organizations such as the California Department of Water Resources; Salt Lake City Public Utilities; Marina Coast Water District; Tucson Water; New York City Water Board; the Colorado Water Conservation Board; Hilton Head, SC; Denver, CO; Scottsdale, AZ; San Antonio, TX; Metropolitan Water District of Southern California; US EPA; the US Department of Justice; the Alliance for Water Efficiency and many others. I have served as the principal investigator and lead or co-author of numerous national and state-level water demand research studies including: Residential End Uses of Water (2016, 1999); Assessing Water Demand Patterns to Improve Sizing of Water Meters and Service Lines (2020); Peak Demand Management (2018); Colorado Water Plan and Update (2010, 2018); National Submetering and Allocation Billing Program Study (2004); Water Budgets and Rate Structures (2008); Commercial and Institutional End Uses of Water (2000); and many others.

I Chair of the subcommittee and am lead author of the American Water Works Association (AWWA) M22 Sizing Water Service Lines and Meters 3rd. ed. (2014) and 4th ed. (pending). I am co-author of the AWWA G480 Water Conservation Standard (2013 and 2020) and co-author of the Colorado Best Practices Guidebook for Municipal Water Conservation (2010). I served as Trustee of the AWWA Water Conservation Division from 2001-2007 during which time I worked with EPA to create the WaterSense™ program and helped establish the Alliance for Water Efficiency. I have been a Senior Technical Advisor to the Alliance for Water Efficiency since 2007. I am a member of the American Water Works Association, the Alliance for Water Efficiency, the American Water Resources Association, the American Society of Civil Engineers (ASCE), the Colorado Water Congress, and the Colorado River Water Users Association.

In 2016, I testified as an expert witness on municipal and industrial water use at the US Supreme Court (FL v. GA, 142 Original) on behalf of the State of Georgia.

A copy of my curriculum vitae is available at www.waterdm.com.

Lake Powell Pipeline DEIS Water Demand Forecast

The Lake Powell Pipeline Project is proposed to deliver 86,249 acre-feet (af) of water annually from Lake Powell to Washington County, Utah to supplement approximately 100,000 af of local surface water supplies to meet a forecast water demand in 2075 of 184,593 af (reproduced below).[254]

This volume of water is ostensibly required to meet a forecast 2075 population in Washington County of 594,660 people, a 293% increase over 60 years. As part of this forecast, per capita water use (inclusive of all uses except system losses) starts at 302 gallons per capita per day (gpcd) in 2015 and is reduced by 20% to 240 gpcd by 2045. After year 2045 there are no additional efficiency improvements and gpcd is forecast to remain at 240 gpcd through 2075. System water losses start at 15.4% in 2015 and continue unchanged through 2075.

Table 1: Future Water Requirements for Washington County WCD produced from Table 6.2-1 from the DEIS

Table 6.2-1 Future Water Requirements for Washington County Water Conservancy District

Year	WCWCD Service Area Population - Baseline Projection (calculated using the Gardner estimate multiplied by UDWRe system ratio)	GPCD per Applied Analysis that includes 20% conservation	System loss from Applied Analysis model	Demand (acre-feet) with System Loss
2015	151,360	302	0.154	59,038
2020	182,689	296	0.154	69,791
2025	214,408	283	0.154	78,483
2030	246,338	271	0.154	86,370
2035	280,731	260	0.154	94,289
2040	314,199	250	0.154	101,326
2045	348,064	240	0.154	107,999
2050	383,226	240	0.154	118,909
2055	420,257	240	0.154	130,399
2060	458,960	240	0.154	142,408
2065	500,349	240	0.154	155,250
2070	545,470	240	0.154	169,251
2075	594,660	240	0.154	184,513

Key:
GPCD = gallons per capita per day
UDWRe = Utah Division of Water Resources
WCWCD = Washington County Water Conservancy District

The 2015 demand data that forms the basis for the future water requirements for Washington County are published by the Utah Division of Water Resources (Table A-5 County 2015 Community Water use[255]). These data show an average of 302 gpcd in Washington County

[254] Reclamation. 2020. Lake Powell Pipeline Project, Draft Environmental Impact, Statement, Coconino and Mohave Counties, Arizona, Kane and Washington Counties, Utah. U.S. Department of the Interior, Bureau of Reclamation. June 2020. Table 6.2-2 Future Water Requirements of the Washington County Water Conservancy District.
[255] 2015 Municipal and Industrial Water Use Data. 2020 version 3. Utah Division of Water Resources. Salt Lake City, Utah.

made of up 231 gpcd of potable water and 71 gpcd of secondary water.[256] In addition to this, the 15.4% water loss added on top in the DEIS, further increasing demand. Figure 15 shows the breakdown of potable use into relevant categories along with secondary water use and water loss calculated at 15.4% to match the DEIS. Secondary use accounts for 20% of the total demand in Figure 15 of 59,038 AF and which matches the DEIS forecast shown in Table 1.

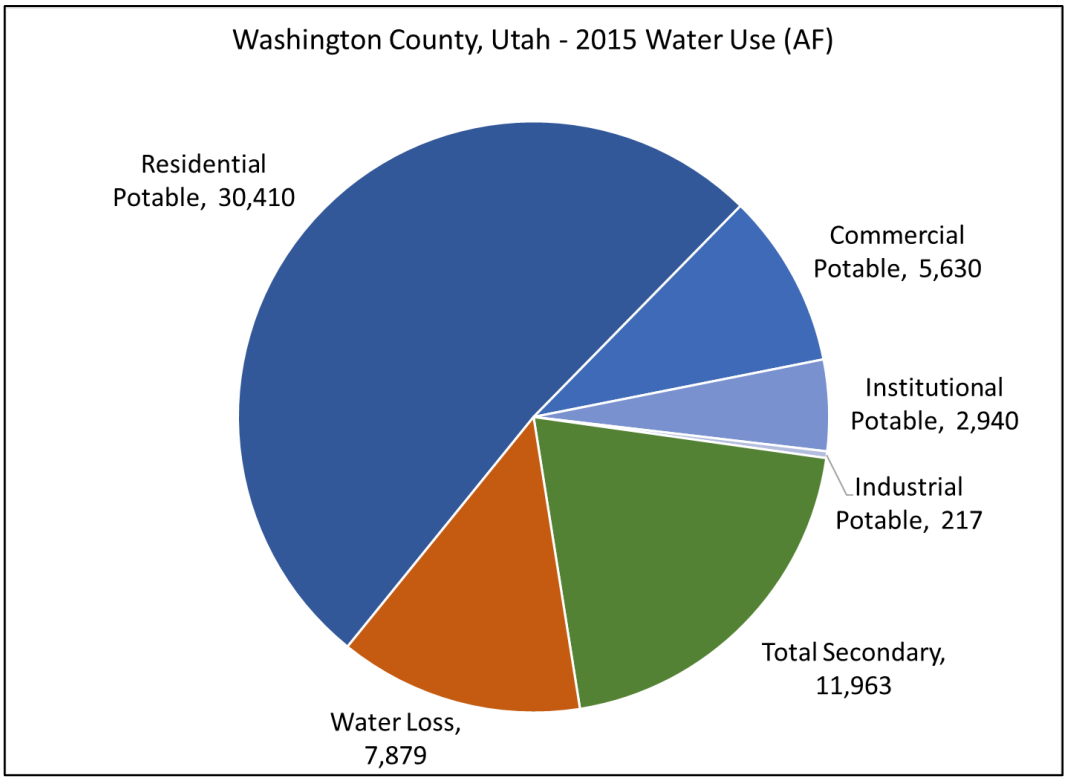


Figure 15: 2015 potable and secondary water use, Washington County, Utah

Using the data in Table 1, WaterDM prepared Figure 16, which shows the DEIS forecast from 2015 – 2075. A 20% conservation factor is applied through 2045, but once the 20% conservation factor ends, demand in Washington County is forecast to increase steeply and unabated for another 30 years. Under this forecast Washington County, which increases demand in each sector proportionally over time, is predicted to have annual water losses of more than 24,000 AF by year 2075, which is more than the potable demands of the commercial and industrial sectors combined.

Figure 16 shows a tripling of water demand in Washington County and assumes that more than 500,000 future residents will only increase efficiency modestly over the next 25 years and that beyond that, no additional efficiency will occur, in spite of high water rates necessitated by expensive infrastructure like the Lake Powell Pipeline, a dry desert climate, and codes and standards that have reduced demand and will continue to reduce demand across the United

[256] Secondary water is defined as "non-potable or untreated water that does not meet EPA Safe Drinking Water requirements. Generally, irrigation and canal companies deliver secondary water through open ditch systems or pressurized pipelines for irrigation of lawns, gardens, landscape, parks, cemeteries, golf courses, and other open areas." (p. 5 2015 Municipal and Industrial Water Use Data. 2020 version 3).

States. The forecast also includes a staggering 293% population increase over the forecast period.

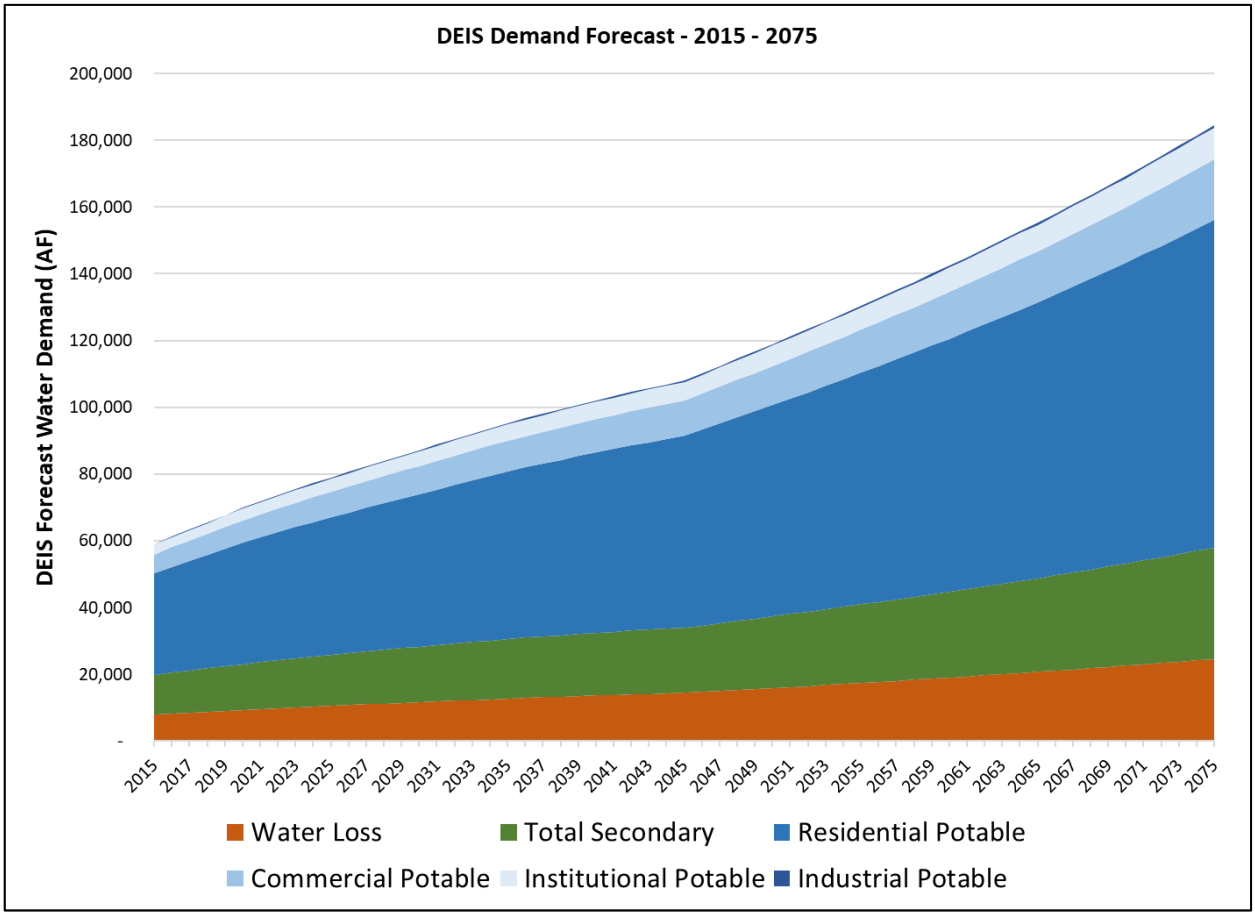


Figure 16: DEIS water demand forecast for Washington County, Utah (2015 – 2075)

WaterDM reviewed each component of the DEIS water demand forecast shown in Table 1 for reasonableness and accuracy as is required to justify construction of a $2 billion infrastructure project.

Per Capita Use Forecast

As part of the DEIS forecast, per capita water use (inclusive of all uses except system losses) starts at 302 gpcd in 2015 and is reduced by 20% to 240 gpcd by 2045. After year 2045 there are no additional efficiency improvements and gpcd is forecast to remain at 240 gpcd through 2075. The reasonableness of this forecast must be considered in the context of changes in water demands that occurred over the past 25 years and comparisons with other water providers in the Western US.

System Per Capita

Annual system per capita use is calculated by taking the total volume of water produced in a year for a water system and dividing that volume by the population and the number of days. Water production volumes are usually measured at water treatment plants before water is put into the distribution system and thus system per capita use typically includes system water

losses that occur as water is transported to customers. The per capita use values presented in the DEIS are inclusive of all water use (residential, commercial, irrigation, etc.) with the notable exception of system water losses which the DEIS separates into a separate category.

Per Capita Use Has Declined Nationally

The US Geologic Survey publishes national water use data every five years and Figure 17 shows the public supply withdrawals in the US and population for 1950 through 2015, the most recent year for which data are available. Public supply withdrawals peaked in 2005 and declined in 2010 and 2015.

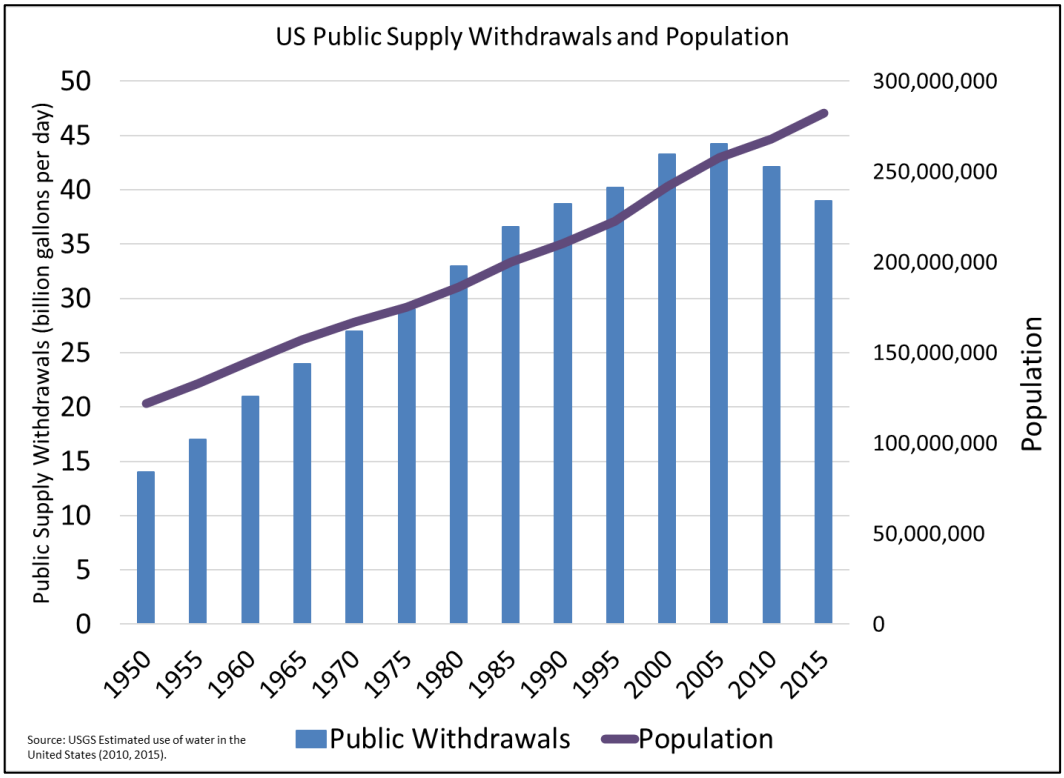


Figure 17: US Public Supply Withdrawals and Population, 1950 – 2015

Figure 18 shows the same US public supply withdrawals along with the average annual gallons per capita per day. Nationally, per capita use peaked in 1985 at about 184 gpcd and by 2015 had declined to less than 140 gpcd. **The DEIS forecasts the 2075 gpcd in Washington County to be 71% higher than the national average in 2015.**

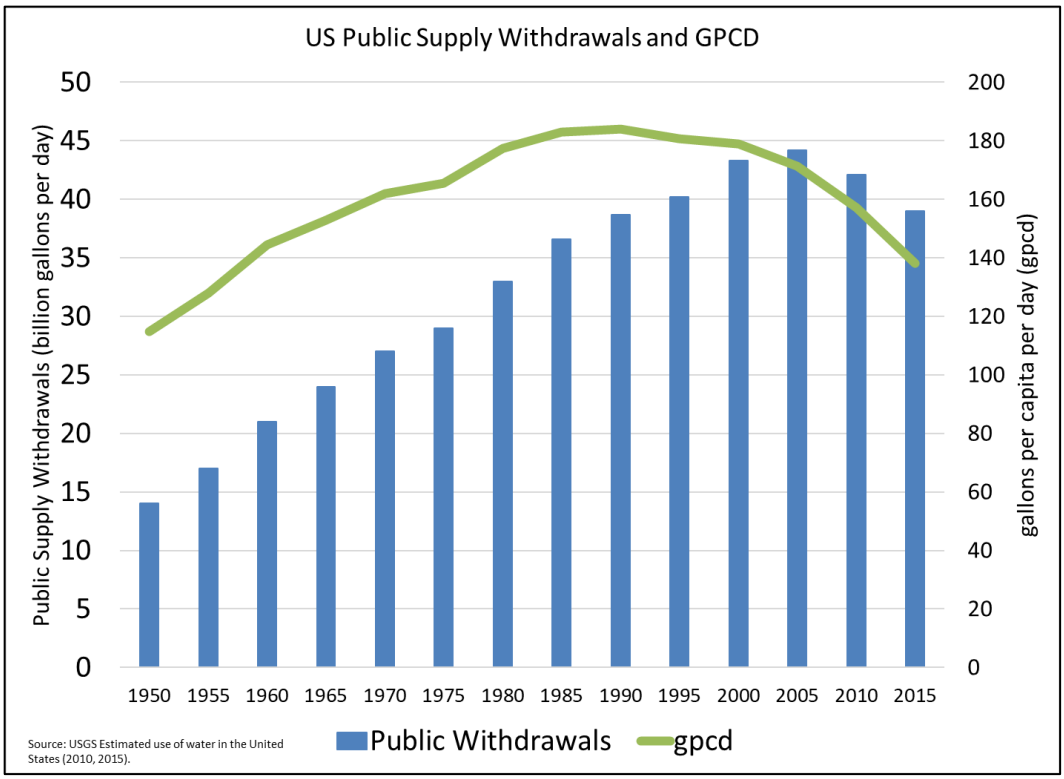


Figure 18: US Public Supply Withdrawals and GPCD, 1950 – 2015

Residential water use in Utah remains among the highest in the US according to the USGS as shown in Figure 19, which was prepared by the City of Tucson to understand how water use around the western US compares. This suggests that Utah, as a state, and Washington County as the highest water using region in the state, have ample room for increased efficiency in the future. Downstream users on the Colorado River like California, Arizona and Nevada are paying attention. Water efficiency is the norm up and down the Colorado River basin as supplies have dwindled as a result of drought and climate change.

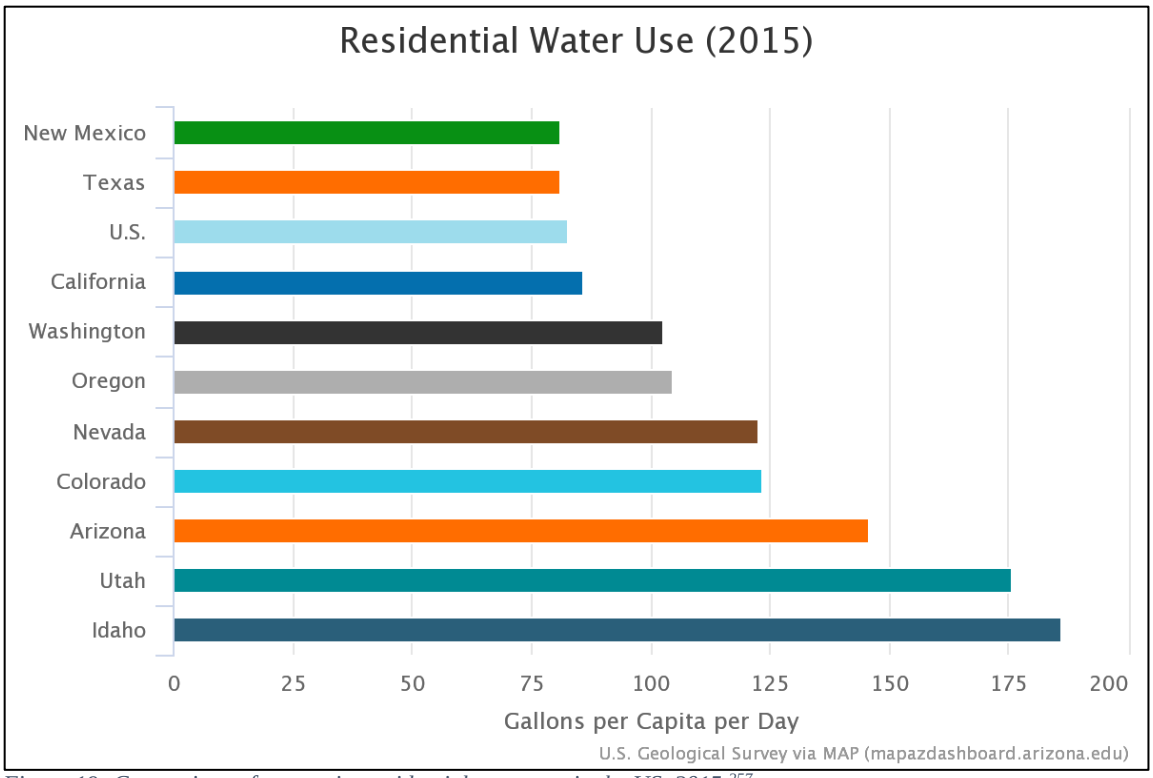


Figure 19: Comparison of per capita residential water use in the US, 2015.[257]

Per Capita Comparisons Show High Usage in Washington County

To better understand the scale of the forecast gpcd values in the DEIS, these data were compared against per capita use from cities that participated in the 2016 Residential End Uses of Water Study.[258] Per capita use was calculated for this study using the same approach as the DEIS with water losses explicitly excluded, but all other uses (residential, commercial, irrigation, etc.) included. The most "apples to apples" comparison of gpcd is to compared potable gpcd and this and other comparisons are presented in Table 2: Per Capita Comparisons. In 2015, even potable water use by itself in Washington County averaged 231 gpcd, placing it among the highest levels of per capita use of comparable western cities as shown in Table 2.

It should be noted that most western cities have concluded that such high levels of per capita water use are unsustainable (not to mention expensive) in arid environments and they have all implemented metering, conservation pricing and various other water efficiency programs to reduce demand and extend existing supplies. The DEIS in recognition of this, applies a steady reduction factor until a 20% reduction is achieved in 2045.

Even with the conservation factor applied, DEIS forecast total per capita use for Washington County in year 2075 is higher than any utility that participated in the 2016 Residential End Uses

[257] https://mapazdashboard.arizona.edu/infrastructure/residential-water-use
[258] DeOreo, W.B., P. Mayer, J. Kiefer, and B. Dziegielewski. 2016. Residential End Uses of Water, Version 2. Water Research Foundation. Denver, CO

Study, including Scottsdale Arizona, which in addition to having high water use also has a well-funded and staffed utility-sponsored water efficiency program.[259]

Table 2: Per Capita Comparisons

Agency	Population	GPCD
Washington County WCD - 2015 potable + secondary + water loss	**151,360**	**348.2**
Washington County WCD - 2015 potable + secondary	**151,360**	**302.0**
Washington County WCD - 2075 potable + secondary + water loss forecast	**594,660**	**277.0**
Scottsdale, AZ – 2010 potable	217,385	273.1
Henderson, NV – 2010 potable	277,502	256.9
Washington County WCD - 2075 potable + secondary forecast	**594,660**	**240.0**
Washington County WCD - 2015 potable	**151,360**	**231.0**
Colorado Springs, CO – 2010 potable	441,000	212.3
Washington County WCD - 2075 potable forecast	**594,660**	**190.0**
Fort Collins, CO – 2010 potable	129,000	157.9
Denver, CO – 2010 potable	1,174,000	156.7
Tacoma, WA – 2010 potable	317,450	150.0
Otay, CA – 2010 potable	198,616	149.9
Tucson, AZ – 2010 potable	545,975	144.0
Mountain View, CA – 2010 potable	72,800	132.6
Aurora, CO – 2010 potable	325,078	126.6
Austin, TX – 2010 potable	886,768	121.9
San Diego, CA – 2010 potable	1,312,000	118.2
Santa Barbara, CA – 2010 potable	91,416	115.0
San Antonio, TX – 2010 potable	1,360,000	105.7
Philadelphia, PA – 2010 potable	1,500,000	104.5
Chicago, IL – 2010 potable	5,300,000	98.4
Sacramento, CA – 2010 potable	430,437	91.4
Portland, OR – 2010 potable	915,800	61.0

Sources: Table 6.2-2 Future Water Requirements of the Washington County Water Conservancy District., DeOreo, W.B., P. Mayer, J. Kiefer, and B. Dziegielewski. 2016. Residential End Uses of Water, Version 2. Water Research Foundation. Denver, CO

Water Efficiency Impacts Not Considered After 2045

The forecast for Washington County in year 2075 would place its water use among the very highest water using communities in the western US today and in the future. With the Lake Powell Pipeline, Washington County must necessarily also have high water rates. A strong price signal through rates is proven effective at reducing consumption, even in communities with second homes and significant volumes of irrigation. Yet the DEIS shows no efficiency improvements or demand reductions in Washington County for a 30-year period.

[259] https://www.scottsdaleaz.gov/water/rebates

It is unclear why efficiency improvements are stopped in 2045. This is neither reasonable, nor realistic, particularly given the anticipated impacts of climate change, which will drive up the cost of providing water and will reduce supplies. All of the new demand in Washington County will come from new residents and new buildings that will be constructed in compliance with modern plumbing codes and standards. These national codes and standards, such as the 1992 Energy Policy Act require that all toilets sold in the US use 1.6 gallons or less per flush. Stores like Home Depot only offer EPA WaterSense certified toilets use that 1.28 gallons per flush or less. New buildings will necessarily be more water efficient than old buildings. Assuming future water use in 2075 will be the same as it was in 2045 without efficiency improvement is not reasonable and not a sound basis for least-cost infrastructure planning.

Recent failures of demand forecasting (discussed below) have exposed demand forecasting methods that fail to include long term efficiency improvements and, thus, water efficiency and efficiency improvement are now standard consideration for most demand forecasts. These forecasting failures have been largely due to inflated future per capita demands and inflated population forecasts – two problems clearly evident in the DEIS.

The changes and efficiency improvements that have been made in indoor residential water use are documented in research conducted by the Water Research Foundation and the American Water Works Association. A summary is presented in Table 3. These data show that modern, water efficient homes in the US will use about 40 gpcd indoors. In the future they could use even less.

Table 3: Summary of per capita use from Residential End Uses of Water Studies (REUWS)

	1999 REUWS (indoor gpcd)	2016 REUWS (indoor gpcd)	WaterSense New Home (indoor gpcd)
Toilet	18.5	14.2	7.7
Clothes Washer	15	9.6	4.4
Faucet	10.9	11.1	8.1
Shower	11.6	11.1	11.0
Dishwasher	1.0	0.7	0.5
Leak	9.5	7.9	5.0
Bath	1.2	1.5	1.5
Other	1.6	2.5	1.6
Indoor Total	**69.3**	**58.6**	**39.8**

Sources: Mayer, P.W., W.B. DeOreo, et. al. 1999. Residential End Uses of Water. American Water Works Association Research Foundation, Denver, CO.; DeOreo, W.B., P. Mayer, J. Kiefer, and B. Dziegielewski. 2016. Residential End Uses of Water, Version 2. Water Research Foundation. Denver, CO; W.B. DeOreo, A. Dieteman, T. Skeel, P. Mayer, et. al. 2001. Retrofit Realities. Journal American Water Works Association, March 2001.

A major emerging trend in water utilities is the use of advanced metering infrastructure (AMI) to detect customer leaks and alert customers about abnormal usage. Recent research has shown that these programs are capable of reducing customer-side leakage by about 50%.[260] As the cost of water increases over the next 50 years, outdoor use will become more and more expensive and landscaping will be adapted accordingly.

Secondary Water Use Improperly Forecast

Baked into the DEIS demand forecast is a substantial component of secondary water use. As shown in Figure 15, secondary water use accounts for about 20% of 2015 demand once water losses are included.

Figure 15: 2015 potable and secondary water use, Washington County, Utah Secondary water is defined as "non-potable or untreated water that does not meet EPA Safe Drinking Water requirements. Generally, irrigation and canal companies deliver secondary water through open ditch systems or pressurized pipelines for irrigation of lawns, gardens, landscape, parks, cemeteries, golf courses, and other open areas."[261]

Because secondary water use is imbedded into the 2015 water demand of 302 gpcd (71 gpcd is secondary water), secondary water demand is automatically increased throughout the 60-year forecast. In Washington County today, most of the secondary water is supplied by irrigation companies with limited water rights. These supplies cannot possibly grow proportionally with population into the future as shown in Figure 16, yet they have been improperly imbedded into the 2015 baseline demand.

[260] https://sfwater.org/index.aspx?page=947
[261] 2015 Municipal and Industrial Water Use Data. 2020 version 3. Utah Division of Water Resources, p. 5.

Even with the 20% conservation factor applied through 2045, secondary water use, which is imbedded into the forecast, must necessarily increase through the demand forecast and after 2045 because of the forecasting methodology. This is not reasonable. The Lake Powell Pipeline should not be constructed to provide secondary water use for irrigation companies, rather the project is only properly considered as a primary potable supply. Water from the Lake Powell Pipeline will be too expensive and high valued to sell as secondary water for irrigation. Use of secondary water is seasonal, thus including it as part of the annual gpcd is misleading from the perspective of supply timing as well.

Secondary water is a separate supply and thus demand for secondary water should be determined distinctly from the potable demand into the future. Lumping them together, as has been done in the DEIS, is improper from multiple planning and forecasting perspectives because demand for secondary water should be considered and forecast separately. This should be corrected. WaterDM estimates that including secondary water in the demand forecast has improperly inflated per capita demands in the DEIS by at least 20%.

The DEIS should be corrected and the Bureau of Reclamation must clarify to what extent secondary water for irrigation companies will be carried in the Lake Powell Pipeline, if at all. The cost of secondary water is generally much lower than for potable water and it is not clear how the economics of the $2 billion Lake Powell Pipeline work if 20% of the supply is sold at secondary water rates not to mention being subject to 15.4% of the supply lost to leakage.

Future Per Capita Use Improperly Inflated

If more than 500,000 people live in Washington County Utah in 2075 and use an average of 277 gpcd (including water losses) it will be one of the most water-inefficient communities in America in that year or any year. It is not reasonable to plan for such inefficiency and profligate water use.

The future per capita use presented in the DEIS has been improperly inflated given that 30 years of potential efficiency gains are ignored, secondary water use is incorrectly included and allowed to increase, and water loss is never addressed.

System Loss Forecast

In the DEIS, a 15.4% water loss factor is applied each year to account for real losses in the system. The 15.4% water loss factor, presumably based on current water loss rates*, does not change over the 60-year period of the forecast* and is applied to both potable and secondary water use. As shown in Figure 16, **the DEIS predicts real annual water losses (e.g., the physical loss of water from the system) of more than 24,000 AF by year 2075**, which is an astonishingly high volume and more than the potable demands of the commercial and industrial sectors combined.

The Lake Powell Pipeline is a $2 billion dollar project and the DEIS forecast states that 15.4% of the product or value delivered through this LPP will be lost each year. This implies that approximately $300 million in value of the initial $2 billion dollar project will be wasted along with additional value of the operation, maintenance, and the repair costs wasted over the life

of the project. This is an outrageous, wasteful, unreasonable, and expensive assumption that is being used to justify an unnecessary project which will have real impacts for water rate payers in Utah. The economic consequences of $300 million in water losses are simply too large to ignore. State and national policies are increasing accountability for water loss and requiring utilities to reduce real loss to the extent it is economically reasonable. In 2020, Utah passed HB 40, which will improve water loss accounting across the state.[262] This increased scrutiny of water losses will apply to Washington County.

The starting point for water loss in Washington County, 15.4%, is an extremely high level of real losses for a system to endure. For many years an industry rule of thumb was that anything above 10% "unaccounted for water" constituted a real problem. Over the past 20 years water loss accounting has improved and advanced, which has improved understanding of typical water loss rates, though they vary tremendously depending upon the age of a water system. Properly designed and installed new distribution systems have lower levels of loss than older water systems and managing system pressure has a significant impact.

It is unreasonable that water loss levels for Washington County do not improve over time in the DEIS forecast. This implies that this high level of waste and loss is tolerable, acceptable, and affordable, none of which is true. More properly, the DEIS forecast should show a decreasing level of water loss over time until a level below 10% is achieved. A level of 6% - 8% would not be an unreasonable target for a well-managed system with many new components, based upon my experience. Maintaining a loss level of 15.4% unreasonably and unnecessarily inflates the final demand forecast by at least 5.4% - 9.4%.

Population Forecast

The single most significant aspect driving future demand in the DEIS forecast is anticipated population growth in Washington County. The DEIS population forecast is based on state forecasts developed by the Kem C. Gardner Policy Institute,[263] but extends the Gardner forecasts another 10 years to 2075. This DEIS forecasts that population of Washington County in 2075 to be 594,660 people, a 293% increase over 60 years. The Gardner forecasts show Washington County to be the fastest growing county in Utah over the next sixty years. If realized, Washington County will be the most populated stretch of I-15 from Las Vegas to Provo.

The rate of population growth starts at a rip-roaring 3.4% per year and reduces by about 50% finishing the 60-year forecast in 2075 at a still remarkably high growth rate of 1.7% per year. It is interesting to note that the DEIS population forecast extends 10-years beyond the 2017 published Gardner Institute forecasts, adding more than 94,000 people during from 2065 – 2075.

[262] https://le.utah.gov/~2020/bills/static/HB0040.html
[263] Utah's Long-Term Demographic and Economic Projections Summary. July 2017. Principal Researchers: Pamela S. Perlich, Mike Hollingshaus, Emily R. Harris, Juliette Tennert & Michael T. Hogue

I have reviewed numerous population forecasts over my 25-year career, but I have seldom encountered a growth forecast as aggressive as the one presented in the Lake Powell Pipeline DEIS. The level of growth projected would create a community the size of Tucson, Arizona, Fresno, California, or Albuquerque, New Mexico, in Washington County by 2075. Even spread out across the county, this would represent a tremendous level of growth across what is now a largely rural area. What is the expected economic driver for this exceptional level of growth?

It is rare in the US for an isolated region to experience a 293% growth surge without a corresponding economic driver. For example, Gilbert, Arizona, one of the fastest growing communities in the US over the past 30 years saw growth driven by technology companies and large businesses that chose to locate nearby. What will drive a similarly high level of growth to Washington County? Tourism to Zion National Park and other attractions in the region may be part of the answer, but certainly not all so it remains unclear what will drive the 293% growth projected for 65 years in Washington County. It seems likely that the population forecast has also been inflated.

An inflated future population results in an inflated future demand forecast. It seems quite possible that the population forecast presented for Washington County is unrealistic and the future population will more likely be much lower. Data and information supporting a 293% population growth has not been offered to my knowledge. Support for a population forecast with an escalating growth rate has not been offered and the DEIS population forecast extends ten years beyond forecasts published by the Gardner Institute.

Inflated Demand Forecasts, Costly Decisions

The factors that combine to create a greatly inflated demand forecast in the DEIS are not unique. Water utilities have struggled with making accurate demand forecasts since the mid-1980s when federal plumbing codes and energy standards began reducing the water used for toilets, showers, faucets, clothes washers, dishwashers, and more.

An August 2020 Pacific Institute report found that California water providers consistently inflated forecasts of future demand even as they tried to incorporate the impacts of efficiency. On average, the report found water suppliers projected that per capita demand would decline by less than one percent per year; but actual per capita demand declined twice as fast.[264] The report states:

> *" Urban water suppliers routinely overestimated future water demand, projecting increases in water demand even as actual demand declined. The is largely due to inflated estimates of future per capita demand, although overestimates of population are also a contributing factor." (p.8)*

The consequences of an unrealistic and inflated demand forecast can be significant and can impact a community for years to come. The report states:

[264] An Assessment of Urban Water Demand Forecasts in California. August 2020. Pacific Institute. Oakland, CA.

> *"Overestimates of future water demands have important implications for local communities and the state. Specifically, they can result in unneeded water supply and treatment infrastructure, higher costs to ratepayers, and unnecessary adverse environmental impacts." (p.8)*

The consequences of the inflated water demand in the DEIS include all of the problems noted by the Pacific Institute such as over-sized expensive infrastructure, higher costs to rate payers, and unnecessary environmental impacts. Even if the Lake Powell Pipeline is constructed and the full population forecast appears, future per capita use is likely to be substantially lower than forecast in the DEIS. An unrealistic population forecast, and unreasonably high levels of water loss compound the problem and further inflate demands to unrealistic levels compared with communities across the western US.

Conclusions

The analysis in this report clearly illustrates how the DEIS water demand forecast for Washington County has been grossly inflated. The forecast is inflated through multiple mechanisms including:

- A population forecast that increases by 293%.
- An excessive level of per capita water use that would make Washington County water users among the highest in the US, even after more than 50 years of available efficiency improvements.
- Improper inclusion and inflation of raw secondary irrigation water in the forecast.
- A 15.4% water loss factor that never improves and thus wastes approximately $300 million in value of the $2 billion dollar project.

A statement of need and water demand forecast for a project of this size and scope must be based on sound data, reasonable assumptions, and conservative resource principles to ensure the water will not be wasted. Water customers across the Western United States have successfully implemented effective water efficiency that today reduced per capita use far below levels shown the DEIS forecast for 2020 and 2075. The forecast in the DEIS provides for an excessive level of per capita water use over the next 55 years with efficiency improvements that simply end at year 2045 with no further improvement in efficiency achieved over the next 30 years. This is neither realistic nor reasonable.

The DEIS forecasts a future population of more than 500,000 people, which is equivalent to a city the size of Tucson, Arizona, or Albuquerque, New Mexico. With this level of development, even spread across Washington County with its rural setting, current housing patterns will necessarily change and fewer people are likely to live in large sprawling single-family homes with a supply of secondary water for irrigation, as is common today. Under this high growth scenario coupled with escalating costs for water, demand will necessarily change and become more efficient. The DEIS forecast should reflect realistic efficient levels of future use, not wasteful and excessive levels as currently presented.

Arguments that Washington County is somehow different or exceptional from other communities in the West because it has second homes, resorts, pools, golf courses, and such and is thus immune to national trends towards higher efficiency are nonsense. Water is a precious and expensive commodity and least cost planning principles must be applied when considering expensive infrastructure projects such as the Lake Powell Pipeline.

Water in Washington County will be expensive in the future, regardless of the source, and economics alone will press down demand. New technology for remotely managing irrigation and for detecting both utility and customer leakage will reduce demands and losses in the future, something ignored in the DEIS forecast. Communities across the Western US, including Aspen, Las Vegas, and Tucson — with many second homes and traditionally high irrigation demand — have successfully reduced both indoor and outdoor water use to levels today that are far below what is forecast in the DEIS for year 2075.

For the past 30 years water demand forecasts prepared by utilities have grossly over-estimated water demands because they ignored the impacts of water efficiency and conservation. The demand forecast in the DEIS makes the same mistake and is inflated and unrealistic. The DEIS forecast ignores obvious trends in usage and future technological improvements as well as economic pressures that have reduced demand, and will continue to do so, because water is such a precious commodity.

This report reviews and analyzes each component of the DEIS demand forecast and shows how it compares with current water use in other communities across the Western US. The analysis in this report shows that the DEIS forecast is highly inflated and likely unrealistic. Even if this exceptional (and highly unlikely) level of population growth were to occur in the southern Utah desert, the water demand forecast for this population has been improperly inflated though several mechanisms. The proposed future level of per capita water use and water loss are excessive and ignore todays best practices and the ongoing impact of water efficiency.

Sincerely,

Peter Mayer, P.E.
Principal

References

An Assessment of Urban Water Demand Forecasts in California. August 2020. Pacific Institute. Oakland, CA.

Dieter, C.A., Maupin, M.A., Caldwell, R.R., Harris, M.A., Ivahnenko, T.I., Lovelace, J.K., Barber, N.L., and Linsey, K.S., 2018, Estimated use of water in the United States in 2015: U.S. Geological Survey Circular 1441, 65 p., https://doi.org/10.3133/cir1441. [Supersedes USGS Open-File Report 2017–1131.]

DeOreo, W.B., P. Mayer, J. Kiefer, and B. Dziegielewski. 2016. Residential End Uses of Water, Version 2. Water Research Foundation. Denver, CO; W.B.

DeOreo, A. Dieteman, T. Skeel, P. Mayer, et. al. 2001. Retrofit Realities. Journal American Water Works Association, March 2001.

Maupin, M.A., Kenny, J.F., Hutson, S.S., Lovelace, J.K., Barber, N.L., and Linsey, K.S., 2014, Estimated use of water in the United States in 2010: U.S. Geological Survey Circular 1405, 56 p., http://dx.doi.org/10.3133/cir1405.

Mayer, P.W., W.B. DeOreo, et. al. 1999. Residential End Uses of Water. American Water Works Association Research Foundation, Denver, CO.

Water Loos Accounting. 2020 General Session. State of Utah. Chief Sponsor: Melissa G. Ballard Senate Sponsor: David P. Hinkins. https://le.utah.gov/~2020/bills/static/HB0040.html

Utah's Long-Term Demographic and Economic Projections Summary. July 2017. Principal Researchers: Pamela S. Perlich, Mike Hollingshaus, Emily R. Harris, Juliette Tennert & Michael T. Hogue