Comments sent via email: lpp@usbr.gov

January 10, 2020

Mr. Rick Baxter, Program Manager
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Provo Area Office
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SCOPING COMMENTS ON THE PROPOSED LAKE POWELL PIPELINE'S NATIONAL ENVIRONMENTAL POLICY ACT IMPACT ANALYSIS

Thank you for the opportunity to submit scoping comments on the Public Notice related to the proposed Lake Powell Pipeline (LPP). See here, referencing Document Citation 84 FR 66929 and Agency/Docket Number RR04963000, XXXR0680R1, RR.17549661.1000000.

Western Resource Advocates (hereinafter "WRA") is a nonprofit conservation organization dedicated to protecting the Interior West's land, air, and water. We promote river restoration and water conservation, advocate for a clean and sustainable energy future, and protect public lands for present and future generations. WRA engages with utilities, state and federal government agencies, and irrigators to find solutions to meet growing urban water demands while protecting stream flows for fish, wildlife, and recreation. WRA has experience helping western communities meet their legitimate water needs, as well as extensive knowledge of the water delivery systems in the Colorado River Basin. Our members and employees are located throughout the arid and semi-arid states of the Interior West.

Because of the momentous scale of its potential impacts, WRA has tracked closely, and commented regularly, on the LPP proposal through its relatively long history, including more than a decade of consideration by the Federal Energy Regulatory Commission (FERC), a process recently terminated after applicant Utah Board of Water Resources (UBWR) withdrew its FERC application. We hereby incorporate by reference extensive prior comments we have submitted on the LPP proposal, which should be available in FERC's elibrary Docket Number P- 12966.

In short, based on information available to date, the LPP proposal has many significant short-comings, among them that the project proposal lacks an accurate purpose and need, and UBWR and the project's proposed beneficiaries (Washington and Kane Counties) have failed to fully develop a reasonable No Action alternative. Moreover, the Bureau's scoping analysis should include a close look the legal and physical constraints to water availability, increased risk to other Colorado River Basin water rights, and the impacts of pipeline alignment to federal and tribal resources.

As a result, we respectfully request that the Bureau of Reclamation, joined by any and all cooperating agencies, closely analyze a wide range of serious issues as you prepare the Draft Environmental Impact Statement (DEIS).

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To meet the requirements of the National Environmental Policy Act, the Administrative Procedures Act, and other relevant federal law, the DEIS must, among other things, closely analyze:

1. LPP beneficiaries' proposed "need"—substantiated with clear and robust analysis of current water use and demand projections—for Lake Powell Pipeline water;
2. Alternatives to the proposed LPP, including a robust No Action alternative;
3. Physical and legal constraints to water availability, including Arizona's Export Statute;
4. Increased risk to Colorado River Basin water rights;
5. Pipeline alignment impacts to federal and tribal lands.

National Environmental Policy Act (NEPA) and related standards

As noted in the Bureau of Reclamation's NEPA Handbook, scoping identifies the public's concerns, defines significant resources issues, and aids in identifying issues defined in other environmental laws.[1]

The appropriate scope for the DEIS must include the range of impacts from the proposed federal action of building the LPP from Lake Powell to Sand Hollow Reservoir, delivering up to 86,249 acre-feet of water annually across over 140 miles.[2] "Impacts" and "effects" are synonymous.[3] Part of the scoping of any EIS is identification of the "affected environment" and the "potentially affected geographical area.[4] The direct, indirect, and cumulative impacts of the proposed action must be considered.[5] Indirect impacts include effects on water and other natural systems, and also economic, social, and cultural impacts.[6]

Because of the size of the proposed project and, if built, its perpetual nature, the DEIS for the LPP must compare the increased risk of shortage and curtailment of upper Colorado River Basin water rights from the proposed LPP to the No Action Alternative.[7] Reclamation must take a "hard look" at the reasonably foreseeable impacts on the Basin from the LPP.[8] Reclamation is also required to identify possible conflicts between the proposed LPP and the objectives of federal and state policies.[9]

The proposed project involves a contract with the Bureau of Reclamation.[10] As a result, the provisions of the federal Reclamation Reform Act (RRA) also apply.[11] Under the RRA, the Bureau has a duty to

[1] Reclamation NEPA Handbook, Ch. 3.5 (found at https://www.usbr.gov/nepa/docs/NEPA_Handbook2012.pdf).
[2] 40 CFR 1501.7, 1508.25.
[3] 40 CFR 1508.8.
[4] 40 CFR 1502.15; Reclamation NEPA Handbook, February 2012, at 3.5.
[5] 40 CFR 1502.16, 1508.7, 1508.8, 1508.25.
[6] 40 CFR 1508.8.
[7] Reclamation NEPA Handbook, at 8.2.2, 8.6.1.
[8] *Id.*; *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 373-74 (1989)
[9] 40 CFR 1502.16(c).
[10] 84 FR 66929.
[11] *See* 42 U.S.C. § 390aa *et seq*.

promote "full consideration and incorporation of prudent and responsible water conservation measures" in the water projects of non-Federal water entities that receive water from Federal reclamation projects.[12] Project beneficiaries must develop conservation plans containing definite objectives, proposed conservation measures and a proposed time schedule for compliance,[13] and must submit their conservation plans to the Bureau.[14] The RRA requires that water recipients certify their compliance with the Act.[15]

1. The Purpose and Need for this project must be substantiated by high quality and detailed water use data, along with a robust analysis of future water demands, using best practices in data collection, forecasting, and inter-governmental cooperation between Washington County Water Conservancy District (WCWCD) and local water retailers.

The purpose of the proposed LPP project—which is to develop water supplies to support future population growth—has been clear all along, however the *need* for this project remains unclear. The data on per capita water use in Washington County has changed several times over the past several years, due to the fact that project applicant does not in fact have clarity on basic information such as how much water is used, when, and by whom.

As a result, the project beneficiaries' future water demand projections are based on inaccurate data. In addition, these demand projections consistently lack detail and are inconsistent with water utility best practices, and therefore fail to substantiate the need for this project. In an era of water scarcity and increased management of the Colorado River, it is imperative that the Bureau of Reclamation require detailed and accurate water data, and robust analysis of future water demands, in order to properly evaluate the potential need for an 86,000 acre-feet per year (AFY) Colorado River development project.

a. Metered, End User Water Data are Critical Components of Needs Assessment

The data on current per capita water use in Washington County has changed several times over the years due to changes in accounting methodologies, indicating a dramatic lack of understanding of current water use, and a lack of standard data management practices. Water use data from *retailers*—not just from Washington County Water Conservancy District (WCWCD), who is the wholesaler—are necessary to accurately demonstrate "prudent and responsible" water and data management, as required by the RRA. Retailer data enables a clear understanding of how much water is used indoors and outdoors by the residential, commercial, industrial and institutional sectors, so that water managers can make informed decisions about how to increase efficiency in the most impactful and cost-effective ways possible, and so that the Bureau of Reclamation can adequately assess whether there is a "need" for this proposed project. However no retailer data exists in any documentation that has been submitted in support of this project.

[12] 42 U.S.C. § 390jj(a).
[13] *Id.* at § 390jj(b).
[14] 43 C.F.R. § 427.1.
[15] 42 U.S.C. § 390ff.

The most recent data being used by the project applicant does not come from metered data from the retail water providers in the county, but rather from analyses that were developed through a State-led effort (UDWRe "2015 Municipal and Industrial Water Use Data" published in 2018). These data likely stem from master metered water supply data provided by the WCWCD, although the data sources are not clear.[16] The project applicants claim their data accounting represents the most "comprehensive water use accounting practices in the United States."[17] This is far from the truth because their data do not distinguish on a community-by-community basis how water is used, when and by whom. End user meter data would provide much more information about current water use, necessary to better determine how to target conservation programs, and would provide a more solid foundation for projecting future water use trends.

In the forthcoming DEIS, the Purpose and Need must be based on detailed and robust current water use and water data management techniques from both the retailers and the wholesaler, WCWCD. This is a necessary component of a defensible "Purpose and Need" statement.

The applicants for the LPP need to clearly address the following questions:

1. Is all culinary water metered throughout the county? If not, what steps need to be taken to get to that point and what is the timeline and cost? What kinds of meter reading systems are used to collect data? Do these systems represent best practices in modern water management (which includes automatic meter reading and advanced metering infrastructure)?
2. Has an assessment of water loss been conducted in each retail provider's system in the county as well as in the WCWCD's system? Are they using best practices to measure and mange water loss (such as the American Water Works Association's M36 manual)? How much water is being lost and what are the options to reduce those losses?
3. How much secondary water is used and how much of is it metered? What is the timeline for metering all secondary water?
4. What impact would robust implementation of these foundational water management best practices (metering, water loss management, water rates) have on supplies and demand management, and the need and purpose of the Lake Powell Pipeline?

Only through the project proponents providing the answers to these basic questions—as part of data management best practices—would the BOR be able to assess how the project proponents are measuring and managing their water demands and whether they have a need for water from the proposed project. The Bureau of Reclamation should examine closely the applicants' answers to these questions, and ask whether it is reasonable to continue to pursue the Lake Powell Pipeline project if these basic and best practices in water management have not yet been fully implemented.

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[16] *2015 Municipal and Industrial Water Use* Data (2018) by UDWRe states that the general methodology (from all regions in the state) for calculating residential water use is derived "from a number of sources: the Water Rights database, the Division of Drinking Water surveys, and community water system representatives" (page 25). There is no specific mention of how data from the Washington County region is derived.

[17] Utah Board of Water Resources, Lake Powell Pipeline FERC Project: P-12966-004 Water Needs Assessment: Demand and Supply Update Public Filing November 16, 2018.

b. Future Demand Projections Must be Detailed and Robust in order to Substantiate the Claimed Need for LPP Water

Robust demand projection are based on detailed current water use data, and a careful assessment of how, why, and when water use is likely to change due to targeted, sector specific demand management programs, changes in climate, temperature and precipitation, as well as any changes in supply.

To date, there has been no such detailed analysis of future demand projections by the project applicants. Over the last eight or more years, all future per-capita water demand projections are based solely on meeting the minimum gallons-per-capita-per-day (GPCD) standards set by the state. There have been at least three state standards in the last eight years, each with increasing stringency. Each time the project applicants simply integrate these new standards without examining (or publicly explaining) exactly *how* those per-capita water use standards will be met, how they could exceed them, and cost of implementation.

Moreover, the project applicants' future water demand projections include just a single water use future rather than examining a range of possible futures. Variables like population growth and per capita water demands are extremely useful to include in this kind of analysis, which would give a basic range of future demands. Specifically we recommend modeling per-capita demand reductions at a rate of 1% per year, a pace of urban conservation common in communities throughout the western United States.

Inclusion of these details and robust analysis of current water use and future water use projections provide something against which the claimed need for the project properly could be evaluated. Much of the missing information and analyses is basic and any water provider should have it, and especially if that water provider is claiming the need for 86,000 AFY from the Colorado River.

In the DEIS, the Purpose and Need and alternatives analysis, including the No Action Alternative, must include water demand projections that provide a detailed analysis of:

1. How will the minimum standards for per-capita water use by project beneficiaries be achieved? [Analyses should identify specific programs and policies, the targeted sectors (residential, industrial, commercial and institutional), and identify the timeframe for implementation. Foundational demand management policies like conservation-oriented tiered rate structures and landscaping ordinances must be evaluated for their impact on water demands across all local jurisdictions and water retailers.]
2. How might the project beneficiaries achieve a 1% per year reduction in per capita water demands? What are the lowest cost options for achieving that, and how do those costs compare with the Lake Powell Pipeline costs?
3. What impacts will variables like shifts in the population demographics (e.g. residential and non-residential water demands) and variable population growth have on future water demands?

The answers to the questions will paint a more complete picture of what the future may hold, and ultimately allow for a more informed determination of the Purpose and Need and alternatives for this project.

2. The No Action Alternative needs to provide realistic and robust alternatives to LPP project, per the requirements of the RRA and including the direction from the Army Corps of Engineers.

The requirements of the federal Reclamation Reform Act (RRA) require the Bureau to promote "full consideration and incorporation of prudent and responsible water conservation measures." Project beneficiaries must develop conservation plans containing definite objectives, proposed conservation measures and a proposed time schedule for compliance,[18] and must submit their conservation plans to the Bureau.[19]

The project applicants must develop a detailed and robust alternative to the Lake Powell Pipeline, which would necessarily include a detailed and robust water conservation plan under the RRA. The project applicants have failed to do so to date, in spite of being presented with a model alternative originally developed by Western Resource Advocates in 2013, and in accordance with the direction from the Army Corps of Engineers, in letter dated June 19, 2019,[20] to the Utah Division of Water Resources, which stated (emphasis added):

> Review of the information you have submitted to date indicates that several items are still needed to complete processing of your individual permit application. **The information we need to receive in order to complete processing of your application for an individual permit is below**
> . . .
>
> 5. Provide alternatives information sufficient to show compliance with EPA's Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR 230). The 404(b)(1) Guidelines state that no discharge of dredged and/or fill material shall be permitted if there is a practicable alternative which would have less adverse impacts on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purpose. Practicable alternatives include, but are not limited to: 1) activities which do not involve a discharge of dredged or fill material into waters of the U.S. and 2) discharges of dredged or fill material at other locations in waters of the U.S. If it is an otherwise practicable alternative, an area not presently owned by the applicant which could reasonably be obtained, utilized, expanded or managed in order to fulfill the basic purpose of the proposed activity may be considered. **Alternatives that we would like to see explored include the following:**
>
> > **a. Western Resource Advocates, Local Waters Alternative, or an alternative that maximizes the viable components of that alternative;**
> >
> > ***

This letter from the Army Corps of Engineers clearly states that the applicant's proposal needs to be contrasted against a No Action Alternative that maximizes the elements of the Local Waters Alternative.

[18] *Id.* at § 390jj(b).
[19] 43 C.F.R. § 427.1.
[20] *See* Attachment A: Letter from Army Corps to Utah Division of Water Resources (June 13, 2019).

In 2013, WRA developed the "Local Waters Alternative"[21], a robust and detailed analysis of common-sense options that can be pursued in lieu of the Lake Powell Pipeline. This alternative focuses on increased water conservation, increased water reuse and estimated realistic levels of water transfers from agriculture to urban areas in coming years.

WRA has repeatedly updated the supply and demand projections based on new population projections and other information provided the state of Utah. Our latest update to the water supply and demand projections from this report was provided in a letter to the Army Corps of Engineers in 2019.[22]

The *Local Waters Alternative'*s three water strategies for meeting the needs of the Washington County community through 2060 are: water demand management (i.e. conservation), water reuse, and the conversion of agricultural water to urban water uses which will happen as population growth continues.

Specifically, the Local Water Alternative explains in detail how:

- Water demands can be decreased at a rate of 1% per year—a documented, typical rate of reduction for many western communities— resulting in 193 GPCD (gallons per capita per day) in 2060.[23] We recommend a few foundational water conservation programs be implemented, specifically conservation-oriented water rates (not the very low stepped "tiered" rates that are currently in place), landscape and new development policies, and metering and measurement of all water use to allow for good decision making in conservation program selection.
- An increased volume of reuse water can help meet the needs for outdoor landscape irrigation, and potentially for commercial/industrial purposes.
- An increased volume of agricultural water will become available for municipal water uses, as a natural function of continued urban population growth.
- The costs of this Alternative are substantially lower than the cost of the Lake Powell Pipeline. As estimated in our 2013 analysis, the alternative are about 1/3 the cost of the Lake Powell Pipeline, plus some undetermined infrastructure costs associated with converting agricultural water supplies.

When these factors are combined, water demands are met—if not exceeded— in 2060. This analysis shows in detail how the potential need for the Lake Powell Pipeline will not arise for several *decades*, and it is pre-mature to be investigating the LPP option when better water data management and robust implementation of these alternatives have not been sufficiently explored by the project applicant.

Figure 1, below, illustrates the synthesis of the *Local Waters Alternative*, with water demand represented by the yellow line and the variety of water supplies represented by the colored blocks and wedges. The original 2013 *Local Waters Alternative* is found in Attachment B.

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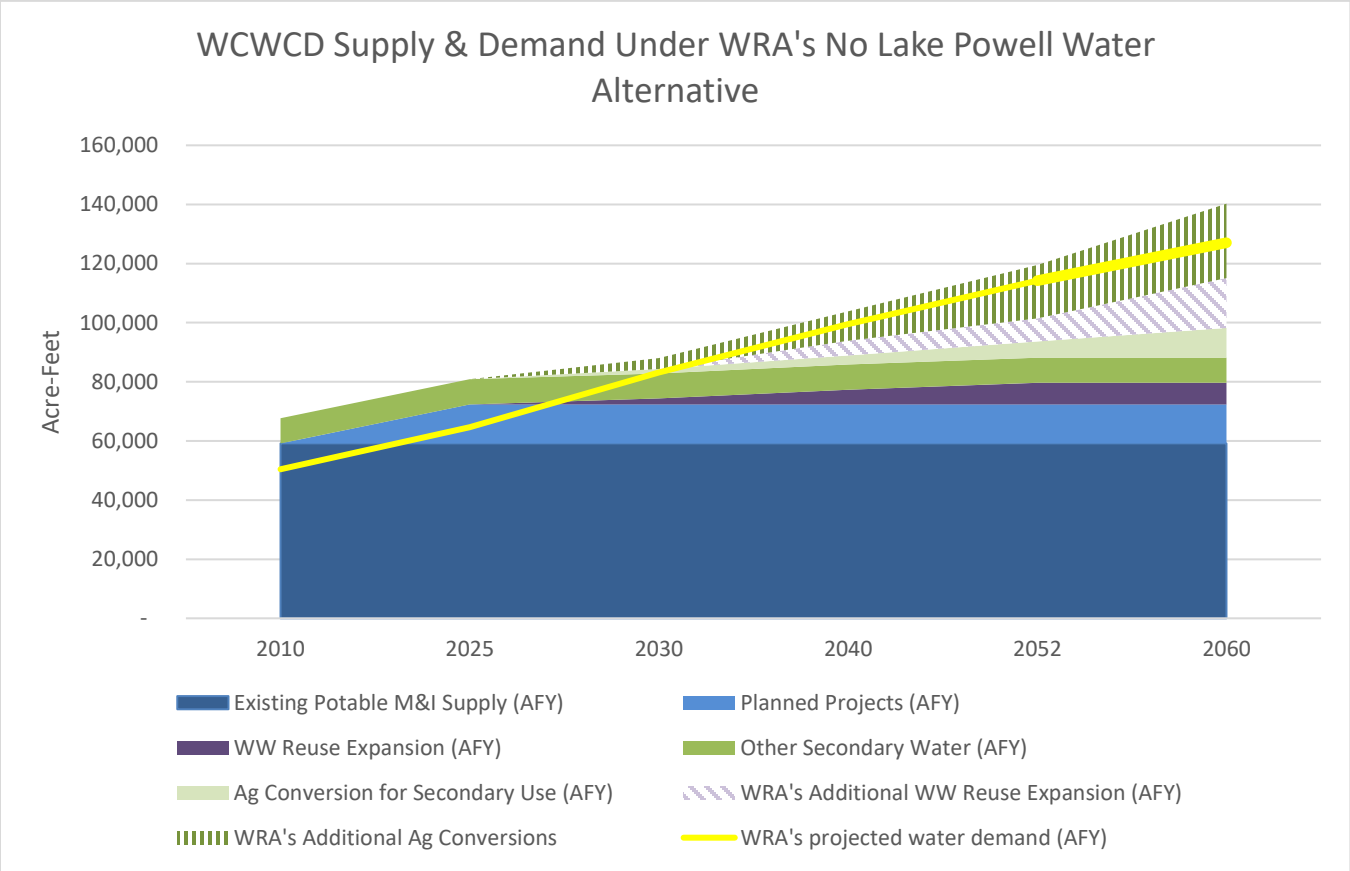
[21] *See* Attachment B: Amelia Nuding, Western Resource Advocates, *Local Waters Alternative to the Lake Powell Pipeline* (Mar. 13, 2013), also available at FERC's elibrary 20130314-5010.

[22] *See* Attachment C: WRA Comments on LPP sent to US Army Corps (January 17, 2019).

[23] Of note, this is higher than in our 2013 analysis which projected 176 GPCD in 2060, because we adjusted the baseline data upward based on data from the DWRe published in 2015.

Figure 1. *Local Waters Alternative* depicted graphically



Pursuant to directive of the Army Corps of Engineers, the Bureau should require an assessment of a robust and reasonable alternative "maximizing" the use of components of the *Local Waters Alternative*. This includes not only a detailed analysis of future demand projections based on good data and a range of possible water demand futures, but an analysis of how local water supplies (including reuse and agricultural water transfers) can supply future needs for the coming decades.

3. Physical and legal constraints to water availability

a. <u>The DEIS must Consider the Impacts of Climate Change on Water Availability and Risk of Shortage in the Colorado River Basin</u>

The growing scientific literature on climate change impacts to water availability in the Colorado River Basin continually improves the understanding that heat-trapping greenhouse gas emissions are causing

increased temperatures throughout the Basin.[24] Some studies have found evidence that this warming already has negatively impacted streamflow.[25] Temperatures are projected to increase an additional 5-6 degrees F throughout the 21st Century[26], and the majority of evidence suggests additional impacts on future demands, streamflow runoff, and overall water availability, especially in the Upper Colorado River Basin.[27] Importantly, the influence of additional temperature increases on water availability may outweigh projected changes in overall precipitation, which are varied and uncertain.[28] Such temperature-driven declines may reduce Colorado River streamflow upwards of 20% by mid-century and potentially 35% by end-of-century.[29]

Reclamation has specifically noted that growing demands in the Colorado River system, in conjunction with theses impacts from climate change, may increase the risk of shortages in the coming decades.[30] The proposed LPP would only exacerbate shortage risks to users throughout the system.

b. <u>The DEIS Also Must Address Limitations and Potential Conditions Imposed by Arizona's Water Export Statute, A.R.S. § 45-292.</u>

The Arizona Water Export Statute expressly prohibits transporting water from Arizona for consumptive use in another state without approval by the Director of the Arizona Department of Water Resources.[31] In the proposed LPP, the Utah Division of Water Resources plans to pump stored water from Lake Powell at a point in Arizona and transport that water via pipeline for consumptive use in Utah. Therefore, the plain terms of the Arizona Water Export Statute apply to the current plans for the Lake Powell Pipeline. Under A.R.S. § 45-292, the Director must hold a formal administrative hearing on the application and consider statutory factors in determining whether to grant, condition, or deny the application to move water out of Arizona.[32]

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[24] Woodhouse, CA et al. (2016): Increasing Influence of Air Temperature on Upper Colorado River Streamflow. *Geophysical Research Letters*, 43, 2174-2181. Available online: https://agupubs.onlinelibrary.wiley.com/doi/epdf/10.1002/2015GL067613

[25] McCabe, GJ et al. (2017). Evidence that Recent Warming is Reducing Upper Colorado River Flows. *Earth Interactions*, Vol. 21, No. 10. Available online: https://journals.ametsoc.org/doi/pdf/10.1175/EI-D-17-0007.1

[26] U.S. Bureau of Reclamation, SECURE Water Act Section 9503(c) Basin Report: Colorado River (found at https://www.usbr.gov/climate/secure/docs/2016secure/factsheet/ColoradoRiverBasinFactSheet.pdf).

[27] Udall, B and J Overpeck (2017): The Twenty-First Century Colorado River Hot Drought and Implications for the Future. *Water Resources Research*, Vol. 53, Iss. 3, pp. 2404-2418. Available online: https://agupubs.onlinelibrary.wiley.com/doi/10.1002/2016WR019638

[28] *Id.*

[29] *Id.*

[30] U.S. Bureau of Reclamation, SECURE Water Act Section 9503(c) Report to Congress, Chapter 3: Colorado River Basin (found at https://www.usbr.gov/climate/secure/docs/2016secure/2016SECUREReport-chapter3.pdf); see also SECURE Water Act Section 9503(c) Basin Report, above.

[31] *See* Attachment D: Arizona Expert Statute, found at A.R.S. § 45-292; *see also id.* at 45-101(3) (defining the "director" as the Director of the Arizona Department of Water Resources).

[32] Article IX(a) of the Upper Colorado River Basin Compact (UCRBC) does not preempt Arizona's ability to reject an application for the Lake Powell Pipeline. Both Arizona and Utah are signatories to the UCRBC. Article IX(a) only protects the consumptive interstate water projects of a "lower," *i.e.* downstream, signatory state against the protectionist laws of an "upper", *i.e.* upstream, signatory state. The Colorado River never re-enters Utah below Lake Powell in Arizona. Therefore, the proposed Lake Powell Pipeline is not protected by Article IX(a) of the UCRBC.

4. Increased Risk to Colorado River Basin Water Rights[33]

The appropriate scope for the Lake Powell Pipeline (LPP) DEIS must include the range of impacts from the proposed federal action of building the LPP from Lake Powell to Sand Hollow Reservoir, delivering up to 86,249 acre-feet of water annually.[34] "Impacts" and "effects" are synonymous.[35] Part of the scoping of any EIS is identification of the "affected environment" and the "potentially affected geographical area.[36] The direct, indirect, and cumulative impacts of the proposed action must be considered.[37] Indirect impacts include effects on water and other natural systems, and also economic, social, and cultural impacts.[38]

The environment and geographical area affected by the LPP include not only the two proposed alignments of the pipeline itself but extend to the entire Colorado River Basin. Water uses in the Colorado River system are intricately entwined through the series of interstate compacts, federal statutes, agreements, and court decisions collectively known as the Law of the River. Impacts caused by the proposed LPP can ripple through the entire watershed, requiring that the entire Basin be identified as the potentially affected environment.[39]

Reclamation is well aware that the Colorado River Basin is currently experiencing its worst drought in recorded history and the period from 2000 through 2018 is the driest 19-year period in over 100 years and one of the driest periods in the 1,200-year paleo-record.[40] It is widely recognized that reduced use of water and additional water conservation is needed to protect the reservoirs in the Colorado River Basin and the water that is essential to the economy and the environment of the Basin.[41] The reductions of water use required by the recently executed Drought Contingency Plans are critically needed efforts "to protect the Colorado River system from crisis."[42]

New depletions from the Colorado River system, such as are proposed by the LPP, are directly at odds with, and damaging to, the efforts of the seven Colorado River Basin states and the Bureau of Reclamation and to bring the system into balance. A "Risk Study" commissioned by river basin roundtables in western Colorado and funded by the Colorado River Water Conservation District and Southwestern Water Conservation District concludes unequivocally that additional consumptive uses of

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[33] This sub-section was written by Anne J. Castle, Senior Fellow, Getches-Wilkinson Center, University of Colorado Law School.
[34] 40 CFR 1501.7, 1508.25.
[35] 40 CFR 1508.8.
[36] 40 CFR 1502.15; Reclamation NEPA Handbook, February 2012, at 3.5.
[37] 40 CFR 1502.16, 1508.7, 1508.8, 1508.25.
[38] 40 CFR 1508.8.
[39] *Hughes River Watershed Conservancy v. Glickman*, 81 F.3d 437, 445-46 (4th Cir. 1996) (holding that downstream impacts of a dam must be considered).
[40] U.S. Bureau of Reclamation, Glen Canyon Dam, https://www.usbr.gov/uc/water/crsp/cs/gcd.html; Testimony of Brenda Burman, Commissioner, Bureau of Reclamation, U.S. Department of the Interior, Before the Committee on Natural Resources, Subcommittee on Water, Oceans, and Wildlife, U.S. House of Representatives, March 28, 2019, at 2.
[41] Testimony of Brenda Burman, March 28, 2019, *supra*.
[42] *Id.* at 6.

water in the Upper Basin of the Colorado River increases both the risk that a shortage will occur and the amount of that shortage.[43] The demand management programs being studied in all four upper Colorado River Basin states (Colorado, New Mexico, Utah, Wyoming)[44] would be undermined and required to work harder and pay for more voluntary water conservation to mitigate new depletions from the LPP.

The proposed depletion of up to 86,249 acre-feet from Lake Powell would constitute an increase of approximately ten percent in the State of Utah's current total consumptive use from the Colorado River system.[45] This type of increase in demand from present levels exacerbates and further increases the risk that the Upper Basin states will be unable to deliver the amounts of water required by the 1922 Colorado River Compact and that curtailment (prohibition of otherwise allowable use) of water rights in those states will be required.[46] It is important to emphasize that the LPP's new demand on the Colorado River system increases the risk of curtailment under the Colorado River to all other upper Colorado River water rights, not just to the LPP itself. While there may be disagreement regarding the amount of incremental increase in the risk of curtailment to existing water rights, there are no known studies or reports contradicting the conclusion that new uses such as the LPP cause increased risk.

The DEIS for the LPP must compare the increased risk of shortage and curtailment of upper Colorado River Basin water rights from the proposed LPP to the No Action Alternative.[47] Reclamation must take a "hard look" at the reasonably foreseeable impacts on the Basin from the LPP.[48] These impacts will include the increased risk to other water rights, which could have significant detrimental economic and social impacts throughout the Basin, as compared to the future without the LPP (no action). The curtailment risks imposed by other action alternatives should also be compared to the No Action Alternative and the LPP proposal.[49]

Reclamation is also required to identify possible conflicts between the proposed LPP and the objectives of federal and state policies.[50] The Department of the Interior's commitment to ensure reliable Colorado River water now and for future generations through water conservation and reduced water use[51] presents a direct conflict with the additional use and depletion proposed by the LPP. This conflict must be considered and discussed in the Environmental Impact Statement.

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[43] Colorado River Risk Study: Phase I Summary Report, Oct. 18, 2016, updated August 1, 2018, Hydros Consulting; Risk Study Phase III Update, June 20, 2019.

[44] *Id.*; *see also* Upper Colorado River Commission, description of demand management investigations, http://www.ucrcommission.com/recent-activities-programs/.

[45] Based on the most recent ten-year average. Reclamation, Provisional, Upper Colorado River Basin, Consumptive Uses and Losses Reports for 2016-2020, 2010-2015, and 2006-2010.

[46] Anne Castle and John Fleck, The Risk of Curtailment under the Colorado River Compact, November 2019, at 31-33, available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3483654.

[47] Reclamation NEPA Handbook, at 8.2.2, 8.6.1.

[48] *Id.*; *Marsh v. Oregon Natural Resources Council*, 490 U.S. 360, 373-74 (1989).

[49] Reclamation NEPA Handbook, at 8.6.1, 8.6.2.

[50] 40 CFR 1502.16(c).

[51] Remarks of David Bernhardt, Secretary of the Interior, Colorado River Water Users Association, Dec. 13, 2019, https://www.doi.gov/pressreleases/following-year-historic-progress-colorado-river-basin-interior-secretary-bernhardt.

5. The DEIS Must Assess Pipeline Alignment Impacts to Federal and Tribal Lands.

The DEIS must assess impacts that various pipeline alignments would have on federal and tribal lands, including artifacts, historical sites, and areas subject to any special designation. Notable among these, as WRA noted in recent comments to FERC, LPP project construction proposes facilities near and possibly within the boundaries of Grand Staircase National Monument, boundaries currently under litigation in federal court.[52] The Bureau of Reclamation should assess whether it is prudent to move forward with any analysis of the LPP proposal until after the resolution of this litigation, as there is a high likelihood the outcome of that litigation will impact the Bureau's permitting analysis.

Sincerely,

Bart Miller
Director, Healthy Rivers Program
Western Resource Advocates

[52] *See* Attachment E: WRA comments to FERC on Original Licensing Proceeding for the LPP (November 16, 2018), at pages 12-16.

Attachment A

-----Original Message-----

From: SPKRegulatoryMailbox [mailto:SPKRegulatoryMailbox@usace.army.mil]

Sent: Thursday, June 13, 2019 1:56 PM

To: ericmillis@utah.gov

Cc: McCarthy.Julia@epa.gov; Goldmann.Elizabeth@epa.gov; larry_crist@fws.gov; James Fargo <James.Fargo@ferc.gov>; nthomas@blm.gov; rbaxter@usbr.gov; Staranch@hotmail.com; nmpoe0920@gmail.com; rsberryslc@gmail.com; Wilson, Matthew S CIV USARMY CESPK (USA) <Matthew.S.Wilson@usace.army.mil>

Subject: Lake Powell Pipeline Project Comments (SPK 2008-00354) (UNCLASSIFIED)

CLASSIFICATION: UNCLASSIFIED

Attached please find our comments on your proposed Lake Powell Pipeline (LPP) project. The comments are based upon our review of the materials that you submitted in response to the public and agency comments filed with the Corps on the currently pending 404 permit application, and your response to the Corps' comment letter dated March 15, 2019.

Please provide your responses and any additional information within 30 calendar days from the date of this letter, or request a time extension, to a specific date, and in writing, by that time. Otherwise, we will consider your application withdrawn. Our withdrawal of your application does not preclude you from submitting the requested information, including any additional information you want us to consider, at a later date. Please refer to identification number SPK-2008-00354 in any correspondence concerning this project.

This document was provided on behalf of Mr. Matthew Wilson, Senior Project Manager, Regulatory Division, Sacramento District, U.S. Army Corps of Engineers. If you have any questions, please contact him at the Bountiful Regulatory Office, 533 West 2600 South, Suite 150, Bountiful, Utah 84010-7744, by email at Matthew.S.Wilson@usace.army.mil, or telephone at (801) 295-8380 ext. 8311.

v/r,

Regulatory Division

US Army Corps of Engineers, Sacramento District

1325 J Street, Room 1350, Sacramento, CA 95814-2922

916-557-5250 FAX: 916-557-7803

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DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT
1325 J STREET
SACRAMENTO CA 95814-2922

June 13, 2019

Regulatory Branch (SPK-2008-00354)

Mr. Eric Millis
Utah Division of Water Resources
1594 West North Temple
Salt Lake City, Utah 84116
ericmillis@utah.gov

Dear Mr. Millis:

This letter concerns your proposed Lake Powell Pipeline (LPP) project. The following comments are based upon our review of the materials that you submitted in response to the public and agency comments filed with the Corps on the currently pending 404 permit application, and your response to the Corps' comment letter dated March 15, 2019. Based upon our most recent discussions, the Corps is aware of LPP's ongoing efforts to examine alternatives that could potentially modify the project footprint, to further avoid and/or minimize impacts to waters of the United States. Should LPP proceed with such project modifications, this may result in a withdrawal of the current application, and the revised project would be evaluated in accordance with our program requirements. If the project is modified, some of the comments in this letter may be rendered moot.

Notwithstanding your ongoing efforts to identify additional avoidance and minimization measures, your application for an individual permit remains active, and we are continuing to process that application. Review of the information you have submitted to date indicates that several items are still needed to complete processing of your individual permit application. The information we need to receive in order to complete processing of your application for an individual permit is below.

1. Describe the extent of indirect impacts to downstream reaches of the drainages to be permanently filled/flooded by the forebay and afterbay reservoirs. These downstream reaches could be deprived of water and/or sediments, and those indirect impacts need to be addressed. Provide an assessment of the extent of indirect impacts and a plan to compensate for those indirect impacts.

2. Provide a plan to ensure that invasive quagga mussels (*Dreissena rostriformis bugensis*) would not be transmitted by the LPP to the receiving basin and/or to streams along the proposed route (as a result of leakage or spill), such as Kanab Creek and the Paria River.

3. Provide a plan detailing measures that would be implemented along the pipeline route to minimize impacts to the aesthetic quality of areas along the pipeline alignment.

4. Provide a plan detailing measures that would be implemented to minimize impacts to sensitive habitats that occur along the length of the pipeline alignment/construction corridor. Of specific concern are adjacent aquatic resources, riparian areas, and sensitive desert soils (biological soil crusts).

5. Provide alternatives information sufficient to show compliance with EPA's Section 404(b)(1) Guidelines for Specification of Disposal Sites for Dredged or Fill Material (40 CFR 230). The 404(b)(1) Guidelines state that no discharge of dredged and/or fill material shall be permitted if there is a practicable alternative which would have less adverse impacts on the aquatic ecosystem, so long as the alternative does not have other significant adverse environmental consequences. An alternative is practicable if it is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of the overall project purpose. Practicable alternatives include, but are not limited to: 1) activities which do not involve a discharge of dredged or fill material into waters of the U.S. and 2) discharges of dredged or fill material at other locations in waters of the U.S. If it is an otherwise practicable alternative, an area not presently owned by the applicant which could reasonably be obtained, utilized, expanded or managed in order to fulfill the basic purpose of the proposed activity may be considered. Alternatives that we would like to see explored include the following:

a. Western Resource Advocates, Local Waters Alternative, or an alternative that maximizes the viable components of that alternative;

b. LPP without hydroelectric component (i.e. eliminate forebay/afterbay permanent impacts); and

c. LPP that clear-spans stream crossings or uses jack-and-bore or other underground techniques at all or a majority of stream crossings to prevent or reduce temporary impacts.

6. Avoidance and Minimization of Aquatic Resource Impacts: Please provide information demonstrating that the proposed alternative avoids and minimizes aquatic resource impacts to the maximum extent practicable. Potential means to be explored to further avoid and minimize impacts include the following:

a. LPP with smaller hydroelectric component (i.e. smaller forebay/afterbay to reduce permanent impacts and/or alternative pump-storage options that could reduce the size of or need for an afterbay);

b. LPP with forebay/afterbay at alternative locations (to reduce permanent impacts);

c. Clear-spanning stream crossings and/or using jack-and-bore or other underground techniques at stream crossings to avoid temporary impacts wherever possible. These considerations should be evaluated at each proposed crossing, but special emphasis should be placed on the evaluation of these techniques at the larger crossings, such as Kanab Creek and the Paria River. Please note that the crossing of Kanab Creek has

been identified as a specific area of concern for the Arizona Game and Fish Department due to the presence of Speckled Dace (*Rhinicthys osculus*) and breeding amphibians in this area.

7. Provide a detailed restoration plan for stream crossings, including baseline assessment of pre-project conditions, methods to reduce and eliminate impacts during construction, and methods to restore pre-construction contours, hydrology, and vegetation (including riparian buffers, as applicable), to ensure that each restored stream crossing will function at a level comparable to pre-project conditions. Propose a monitoring schedule, monitoring parameters, and performance standards to document successful rectification of temporary impacts. Please ensure the plan distinguishes between what will be needed to restore small crossings versus what will be needed to restore larger crossings (e.g. Kanab Creek and the Paria River).

8. Please submit a final compensatory mitigation plan that describes how you will effectively compensate for direct and indirect impacts to waters of the United States. The plan must be consistent with 33 Code of Federal Regulations (CFR) Part 332, and must include all required elements specified in 33 CFR, Part 332.4(c)(2–14). Please ensure the plan addresses the comments in our letters dated April 6, 2017 and September 20, 2017.

Your plan should include an aquatic resources delineation, design drawings, vegetation plans, including target species to be planted, and final success criteria and should be presented in the format identified in the Final 2015 Regional Compensatory Mitigation and Monitoring Guidelines for the South Pacific Division, which can be found on line at http://www.spd.usace.army.mil/Portals/13/docs/regulatory/mitigation/MitMon.pdf .

9. Provide documentation that FERC, as lead federal agency for this project, has determined the LPP to be compliant with Section 106 of the National Historic Preservation Act (Section 106).

10. Provide documentation that FERC, as lead federal agency for this project, has determined the LPP to be compliant with Section 7 of the Endangered Species Act (Section 7).

11. Provide documentation that FERC, as lead federal agency for this project, has fulfilled its tribal coordination and consultation responsibilities.

12. Provide documentation that a Section 401 water quality certification has been issued for this project by the State of Utah.

13. Provide documentation that a Section 401 water quality certification has been issued for this project by the State of Arizona.

You should provide your responses and any additional information within 30 calendar days from the date of this letter, or request a time extension, to a specific date, and in writing, by that time. Otherwise, we will consider your application withdrawn. Our withdrawal of your application does not preclude you from submitting the requested information, including any additional information you want us to consider, at a later date. In that event, we can reactivate and continue processing your application. We encourage you

to use this opportunity to resolve or rebut objections and to insure all available information is in our administrative record. The decision to issue or deny a Department of the Army permit is our responsibility and we will consider all factors of the public interest in making that decision.

Please refer to identification number SPK-2008-00354 in any correspondence concerning this project. If you have any questions, please contact me at the Bountiful Regulatory Office, 533 West 2600 South, Suite 150, Bountiful, Utah 84010-7744, by email at *Matthew.S.Wilson@usace.army.mil*, or telephone at (801) 295-8380 ext. 8311. For more information regarding our program, please visit our website at *www.spk.usace.army.mil/Missions/Regulatory.aspx*.

Sincerely,

Matt Wilson
Senior Project Manager
Nevada-Utah Section

Enclosures

cc:
Julia McCarthy – USEPA Region VIII (McCarthy.Julia@epa.gov)
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Document Content(s)

Attachment B

By Amelia Nuding
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March 13, 2013

The Local Waters Alternative To the Lake Powell Pipeline

I. INTRODUCTION

The Local Waters Alternative is a solution for meeting the future water demands of Washington County, Utah, without the development of the Lake Powell Pipeline. This pipeline, as proposed by the Utah Board of Water Resources, would deliver 69,000 acre-feet per year (AFY) to Washington County, and 4,000 AFY to Kane County.[1] In contrast, the Local Waters Alternative proposes greater water efficiency throughout Washington County, and demonstrates how, under the increased conservation scenario, local supplies can exceed demands by 20% in 2060 without the Lake Powell Pipeline. Local supplies include water reuse and agricultural water transfers. The Local Waters Alternative could cost about two-thirds less than the proposed Lake Powell Pipeline.

There is a clear need for this Local Waters Alternative. Basin-wide, demand for water from the Colorado River already outstrips annual supplies,[2] so any new withdrawals should be carefully scrutinized. However, the data used to establish Washington County's future water demands and supplies - and justify the Lake Powell Pipeline - contains numerous errors and assumptions that undermine its credibility. Specifically, current rates of water use are estimates applied across the county, as opposed to being derived from recently measured data, and the reported current water supplies and future estimates are inconsistent within and across the Draft Study Reports. In

[1] Originally the proposal also included 13,000 AFY to be delivered to Central Iron County, but the county has since withdrawn its request for water from this project, due to the proposal's high costs.
[2] U.S. Department of the Interior, Bureau of Reclamation. 2012. *Colorado River Basin water supply and demand study*. pg. SR-7. Retrieved from: http://www.usbr.gov/lc/region/programs/crbstudy/finalreport/index.html

addition, the water supply alternatives presented in the Draft Study Reports do not sufficiently explore the range of options to meet future water demands. Thus, this alternative, named the "Local Waters Alternative" is submitted as a viable No Action Alternative to the Lake Powell Pipeline.

The Local Waters Alternative projects future water demand in Washington County based on the most recent population projections from the State of Utah and is based on more ambitious yet realistic levels of conservation. It also recasts volumes of water that could be available to meet those demands from reuse and agricultural water transfers, and demonstrates that these options are more cost-effective than the Lake Powell Pipeline. The focus is exclusively on Washington County, since this County claims the largest need for this pipeline[3], and it has been established that Kane County already has sufficient water supplies to meet its demands through 2060 without the pipeline.[4]

The following sections present a revised future water demand based on the latest population projections (Section II), the Alternative to the Lake Powell Pipeline which features more conservation and greater emphasis on local supplies (Section III), and an economic analysis of this Alternative as compared with the Pipeline (Section IV). These analyses show that the Local Waters Alternative is a viable option for Washington County to meet its water demand with only local water supplies through 2060. The Local Waters Alternative should be included in the forthcoming Environmental Impact Statement (EIS) to be issued by FERC.

II. WATER DEMAND & SUPPLY

This section establishes a revised water demand projection for Washington County due to the recently revised population projections from the Utah's Governor's Office of Planning and Budget (GOPB), released in December 2012. This demand projection relies on the same per capita rates of water use (current and future) as those presented in the Draft Study Report 19 Water Needs Assessment.[5] Current and future supplies are also re-established based on information provided in Draft Study Report 19.

A. Updated Population and Water Demand Projections

Population projections are fundamental to future water demand projections. Draft Study Report 19, released in 2011, relied on population projections developed by the GOPB in 2008. In December of 2012, the GOPB released new projections, based in part on the US Census 2010

[3] MWH. 2011. Lake Powell Pipeline Study: Water Needs Assessment. Draft Study 19. Prepared for Utah Division of Water Resources. Pg. ES-5.
[4] MWH. 2011. Lake Powell Pipeline Study: Water Needs Assessment. Draft Study 19. Prepared for Utah Division of Water Resources. Pg. ES-24.
[5] MWH. 2011. Lake Powell Pipeline Study: Water Needs Assessment. Draft Study 19. Prepared for Utah Division of Water Resources.

survey. Importantly, the *actual* population in 2010, which was the baseline data year in Draft Study Report 19, was 17% lower than the 2008 projections estimated. Additionally, the GOPB lowered the projected growth rates over the 2010 – 2060 period, resulting in a 2060 population projection of about 582,000 people in Washington County, as compared with about 860,000 in the 2008 projection. This is a significant shift; one that is incorporated into the Local Waters Alternative and which should be incorporated into the FERC EIS analysis.

Accurate baseline water use data is also essential for developing future water demand projections. However, the reported water use rates in Washington County are only estimates, and not based on reliable or recent data. Draft Study Report 19 estimates that the per capita rate of use in Washington County in 2010 was 291.6 gallons per capita per day (GPCD). This estimate was derived from a complex process, which included using culinary (i.e. potable) water data from six cites in 2009, developing ratios from Division of Water Resources (DWRe) data in 2005, and making multiple, additional assumptions.[6] While this may have been a reasonable approach to create a rough estimate, it indicates that there is very little certainty in the accuracy of this number. This estimate is not a reasonable substitute for actual, measured annual water use data, when claiming a need for additional water supplies. Thus, it is essential that actual, measured water use data be analyzed in the Environmental Impact Statement, before FERC license approval.

Table 1 shows the original and revised population and water demand projections. The revised water demands rely on the same rates of per capita water use as provided in Draft Study Report 19. These rates of water use were determined by the project applicants based on the original State conservation goal, which was a 25% reduction in per capita water use by 2050. However, an important policy shift took place in January 2013; Utah's Governor Gary Herbert moved this target up to 2025. This change is not reflected in the figures below or in any subsequent analyses, because Washington County's conservation goals beyond 2025 are unknown. The effect of this policy would be to accelerate the County's conservation goals, resulting in a much closer alignment with the Alternative's conservation goals through 2025.

The projected demands below reflect the project applicants' original conservation goals (set forth in Draft Study 19) combined with the most recent population projections. It does not reflect the recent State policy shift in conservation goals. The result is water demand in 2060 that is 75,300 acre-feet per year less than the projected demands in Draft Study Report 19 for the year 2060. Using actual measured data would provide even greater accuracy in projecting future water demands.

[6] MWH. 2011. Study 19. Section 2.3

Table 1. Revised population and water demand projections made in 2012 are significantly lower than estimates from 2008. Total water demands (potable and non-potable) are expressed in acre-feet per year (AFY). Population and water values have been rounded to the nearest hundred.

	Revised Population and Water Demand Projections						
		2010	**2020**	**2030**	**2040**	**2050**	**2060**
Original	2008 GOPB Population Projection	168,100	279,900	415,500	559,700	709,700	860,400
	Draft Study Report 19 GPCD	291.6	275.4	263.4	254.3	247.5	241.6
	Draft Study Report 19 Projected Demand (AFY)	54,900	86,300	122,600	159,400	196,800	232,800
Revised	2012 GOPB Population Projection	138,700	196,800	280,600	371,700	472,600	581,700
	Draft Study Report 19 GPCD	291.6	275.4	263.4	254.3	247.5	241.6
	Revised Projected Demand (AFY)*	45,300	61,900	85,000	108,500	132,800	157,500
Difference between Original and Revised	Projected Water Demands (AFY)	9,600	24,400	37,600	50,900	64,000	75,300

*Calculated by multiplying the gpcd by the population and the number of days in a year (365), and dividing by the number of gallons in an acre-foot (325,851).

B. Current & Future Water Supplies

Current water supplies in Washington County also required estimation due to the data inconsistencies in Draft Study Report 19, which resulted in reported supplies that differ by as much as 15% (about 12,000 AFY). These inconsistencies are documented in Appendix A, and a

critique of the supply estimation methodology used can be found in Appendix B. Thus, we request that consistent and well-documented water supply data also be a pre-requisite to properly establish the Purpose and Need in the forthcoming EIS, before any license approval.

At present, Washington County reportedly has 74,560 AFY of potable supplies and 7,450 AFY of secondary (non-potable) supplies, primarily from reservoirs, creeks, wells and reuse. These data were derived directly from Draft Study Report 19, although, as noted above, conflicting information is found in the report. These numbers were chosen because 1) they are reported most frequently in Draft Study Reports 19 and 2) they are reported most frequently in the cited reference documents.[7] The future supplies are identical to those identified in Draft Study Report 19, but do not include the Lake Powell Pipeline.

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 1 below illustrates how these future supplies compare with the revised demand projection. The resulting gap between demand and supplies in 2060 is at least 34,000 AFY, which is only half of the claimed need for 69,000 AFY from the Lake Powell Pipeline. It is worth noting that the predicted volume of reuse will decrease as a result of the smaller projected population. This is accounted for the in Local Waters Alternative. The project proponent's predicted gap in 2060 (about 33,500 acre-feet) does not sufficiently support the claim for needing 69,000 acre-feet water from Lake Powell. Beyond 2060, population growth and water demands are uncertain, and beyond water utilities' typical planning horizon of 30 years. Thus, the analysis is confined to the 2060 timeframe.

[7] WCWCD 2010 Water Management and Conservation Plan; WCWCD Capital Financing Program Amended 2006; DWRe 2009 Municipal and Industrial Water Supply and Uses in the Kanab Creek/Virgin River Basin (data from 2005); DWRe 2009 State of Utah Municipal and Industrial Water Supply and Use Studies (data from 2005).

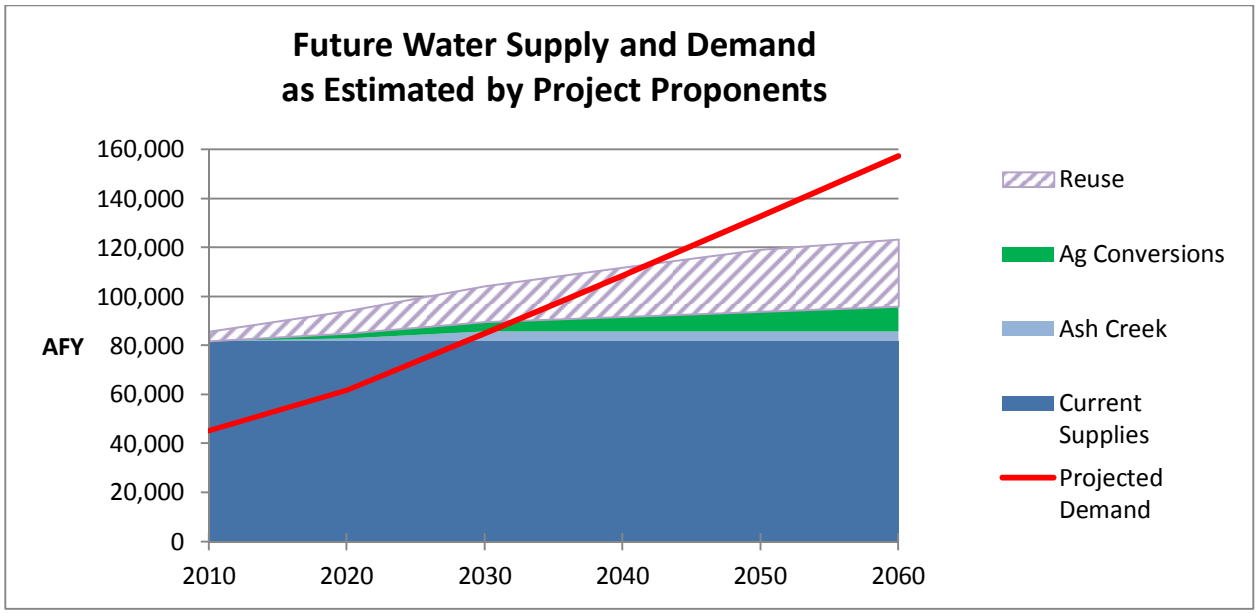

Figure 1. According to the project proponent's assumptions, Washington County could have a 34,000 acre-foot gap between projected water supplies and demands in 2060. Volumes of water are shown in acre feet per year (AFY). The volume of reuse water could be lower than originally predicted, and so it is shown with lines to indicate this variability.

The following section describes the Local Waters Alternative, which emphasizes water conservation as a solution to closing the gap between water supply and demand.

III. LOCAL WATERS ALTERNATIVE

The Local Waters Alternative is divided into three parts. Section IIIA summarizes the Alternative to the Lake Powell Pipeline, which features lower demand for water through conservation and greater volumes of water supplies from local resources. Section IIIB describes in detail a realistic and achievable conservation plan that will significantly reduce future water demands, and Section IIIC describes in detail the volumes of future water supply from reuse and agricultural water transfers. Implementing each of these strategies will close the supply and demand gap in Washington County, and obviate the need for the Lake Powell Pipeline.

A. Local Waters Alternative Summary

The distinguishing feature of the Local Waters Alternative is the emphasis on greater conservation. Future per-capita demand is modeled to decline by 1% per year – that is, every year per capita water use will decline by 1% based on each previous year's level of per capita water use, through 2060. This is a conservation rate that has been achieved by numerous water agencies in the Colorado River Basin, and results in a per capita water use rate in Washington

County in 2060 that is comparable with water use rates in other municipalities *today* in the Colorado River Basin. Importantly, this rate of conservation is achievable and goes a long way toward closing the supply and demand gap, reducing total demands in 2060 by over 42,000 AFY.

Figure 2 depicts this demand scenario along with future water supplies in Washington County under the Local Water Alternative. Each water supply is phased in incrementally over time, resulting in a water supply in 2060 that is between 116,300 – 138,000 AFY, exceeding projected demands. Importantly, these alternative supply options can be developed in different ways at different times, allowing for greater flexibility in meeting future water needs. Thus, under the Local Water Alternative, there is no need for additional water from the Lake Powell Pipeline even by 2060.

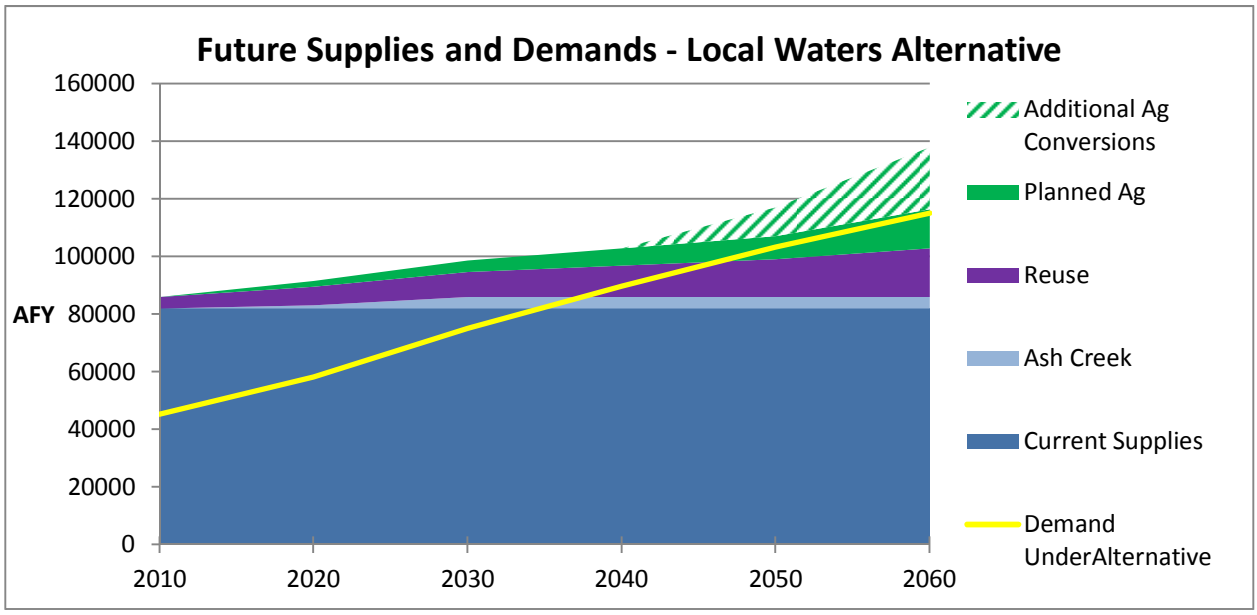

Figure 2. Under this Local Waters Alternative supplies can meet and exceed water demands through 2060 and beyond. Water volumes are shown in acre-feet per year (AFY).

B. Alternative Demand –1% Conservation Per Year

The Local Waters Alternative features a steady 1% reduction in per capita future demand, based on each previous year's per capita water use. This conservation strategy would result in a total water demand of about 115,000 AFY in 2060, lower than projected future supplies identified under this Alternative. The Local Waters Alternative features reductions across all sectors and identifies numerous pathways to achieve the 1% goal overtime, which is markedly different from the Draft Study Report 22 Alternatives report[8] which considers only the near elimination of outdoor residential water use as the sole conservation strategy. [9] The following sections

[8] Utah Board of Water Resources. 2011. Draft Study Report 22, Alternatives Development.
[9] *Ibid*, pgs. 3-8

demonstrate in detail that a 1% annual decrease in demand is both achievable and an economically viable option for Washington County.

The 1% Conservation Rate

Washington County water providers can reduce per capita water use by 1% per year, starting in 2010 and extending out to 2060, with reductions based on each previous year's use. Over the 50 year timeframe, this represents a nearly 40% reduction in per capita use from 2010 levels. This is a common rate of conservation improvement, based on the achievements of many cities in the west. Moreover, it results in a per capita water use rate in 2060 that has already been achieved or surpassed by many western cities *today*.

A recent survey of 100 cities and water agencies in the Colorado River Basin found that "the majority of people receiving water from the Colorado River basin live in areas where per capita deliveries dropped an average of at least one percent per year from 1990 to 2008" (emphasis added).[10] Some of water agencies that achieved per capita declines of 1% or more per year are located in Salt Lake City, Provo, West Jordan, Orem, Springville and Pleasant Grove.[11] Twenty-eight of 100 water agencies surveyed reduced *total* water deliveries despite seeing increases in population over the same period of time.[12] And although St. George was not among the regions to reduce per capita water use by 1% per year (between 1990 and 2008), in 2008 St. George anticipated that their per capita water use would decline by 1.5 – 2% per year in the years going forward as a result of their conservation program efforts. [13]

Outside the Colorado River Basin, the State of Texas has adopted this same conservation goal. The State convened a Task Force in 2004, which ultimately recommended a 1% per capita water-use reduction goal, driving their system-wide water use down to 140 gallons per capita per day.[14,15] Already, dozens of utilities in Texas have met this goal, and as a result of their success they have set new, lower goals.

A 1% rate of conservation in Washington County would result in a total demand of 115,000 AFY in 2060, with a system-wide water use rate of 176 gallons per capita per day (gpcd). In contrast, the conservation plan proposed in Draft Study Report 19 would result in a total demand of 158,000 AFY and a system-wide water use rate of 242 gpcd in 2060. The conservation

[10] Cohen, M. J. 2011. Municipal Deliveries of Colorado River Basin Water. Pacific Institute. pg. iii
[11] *Ibid.* pg. 31
[12] *Ibid.* pg. iii
[13] City of St. George. 2008. Water Conservation Plan Update.
[14] S.B. 1094, 78th Leg., Reg. Sess. (Tex. 2003).
[15] Water Conservation Implementation Task Force, Texas Water Development Board Special Report. Report to the 79th Legislature, at 5-6 (2004). Available at: http://www.conservewatergeorgia.net/resources/TX_Conservation_Task_Force_Recs.pdf

proposal in Draft Study Report 19 represents an average annual conservation rate of 0.37% per year, using the same methodology described earlier. While this target meets or exceeds the State's water reduction goals, it is considerably less ambitious than other cities' goals (see Figure 4 and Figure 5).

The water conservation rate proposed by the project applicants, just like the Local Waters Alternative, includes *passive* conservation. Passive conservation is the conservation naturally achieved due to the replacement of older water-using devices, with newer, more efficient ones. This effortless level of water conservation is estimated to be 0.30% per capita per year, according to the State of Colorado's Statewide Water Supply Initiative study.[16] This same rate is applicable to the State of Utah because it is dependent primarily on national plumbing standards and appliances or fixtures that are sold nation-wide, rather than particular local policies or individual water use patterns. Notably, passive conservation may be even greater than is assumed here because of California's water-efficiency legislation and large market-share which has the power to influence national appliance manufacturing standards. Thus, Washington County's *active* conservation efforts will only amount to a 0.07% reduction per capita per year, which is not a significant savings beyond what would be achieved without any plan at all.

Moreover, the County's proposed conservation target is significantly lower than it has been in the past. The proposed plan would result in a total reduction of 17% in per capita use from 2010 to 2060. However, the County has *already* achieved a 13% reduction in per capita use in just nine years (2000-2009). In addition, based on the suite of conservation programs that the county plans to undertake in the coming years[17], it is very likely that the County will exceed its own, modest projections. While the first conservation savings are often the easiest to achieve, it is clear that the County can achieve much more over the course of the next 50 years given the experience of other utilities within the arid West.

[16] Colorado Water Conservation Board. 2010. Statewide Water Supply Initiative. Denver, CO.
[17] MWH. 2011. Lake Powell Pipeline Study: Water Needs Assessment. Draft Study 19. Prepared for Utah Division of Water Resources. Pg 5-13

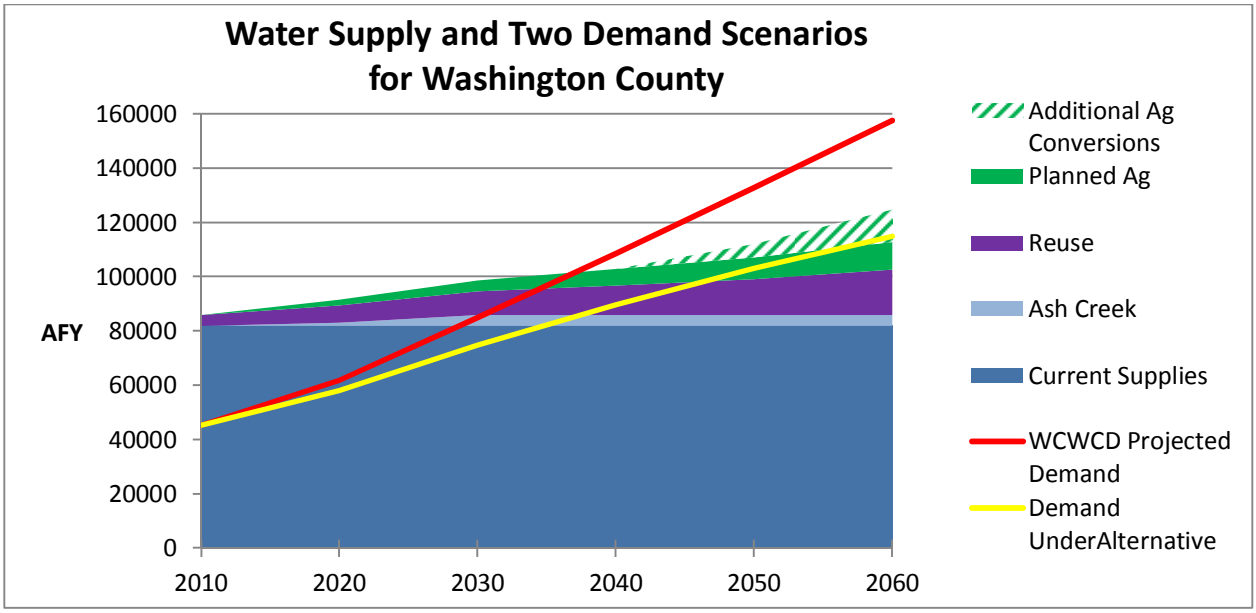

Figure 3. A one percent annual reduction in water use each year will result in a 2060 water demand that is 42,500 AFY lower than the WCWCD's projected demand.

Feasibility of Proposed Rate of per Capita Water Use

Washington County reportedly had a system-wide total water use rate of 292 gallons per capita per day (gpcd) in 2010, which includes both culinary (potable) and secondary (non-potable) water across all sectors. System-wide *potable* use and *residential* only water use are standard units of measurement used by states, water utilities, and water professionals all across the country. Thus, Washington County's reported system-wide use is broken down into these two categories, using water data from the State of Utah. [18] System-wide potable use (culinary water, not secondary water, used by residents, businesses, industry, government, etc.) was 241 gpcd in 2010, and total *residential* water use (potable and non-potable) was 178 gpcd in 2010. These rates of water use are compared with 30 cities throughout the western United States that were surveyed by Western Resource Advocates in separate reports in 2006[19] and 2008.[20] Washington County lands at the high end of the water use spectrum in both cases.

[18] This is derived from the DWRe 2005 Kanab Creek/Virgin River M&I Water Use Report. It assumes the same ratio of water uses by sector and water type as listed in this report, which Study 19 also relied upon. See Appendix B for all details regarding all GPCD computations and comparisons.
[19] Hutchins-Cabibi, T., Miller, B. 2007. Front range water meter: water conservation ratings and recommendations for 13 Colorado communities. Boulder, CO. Western Resource Advocates.
[20] Beckwith, D., Figueroa, J. 2010. Arizona water meter: a comparison of conservation programs in 15 Arizona communities. Boulder, CO. Western Resource Advocates.

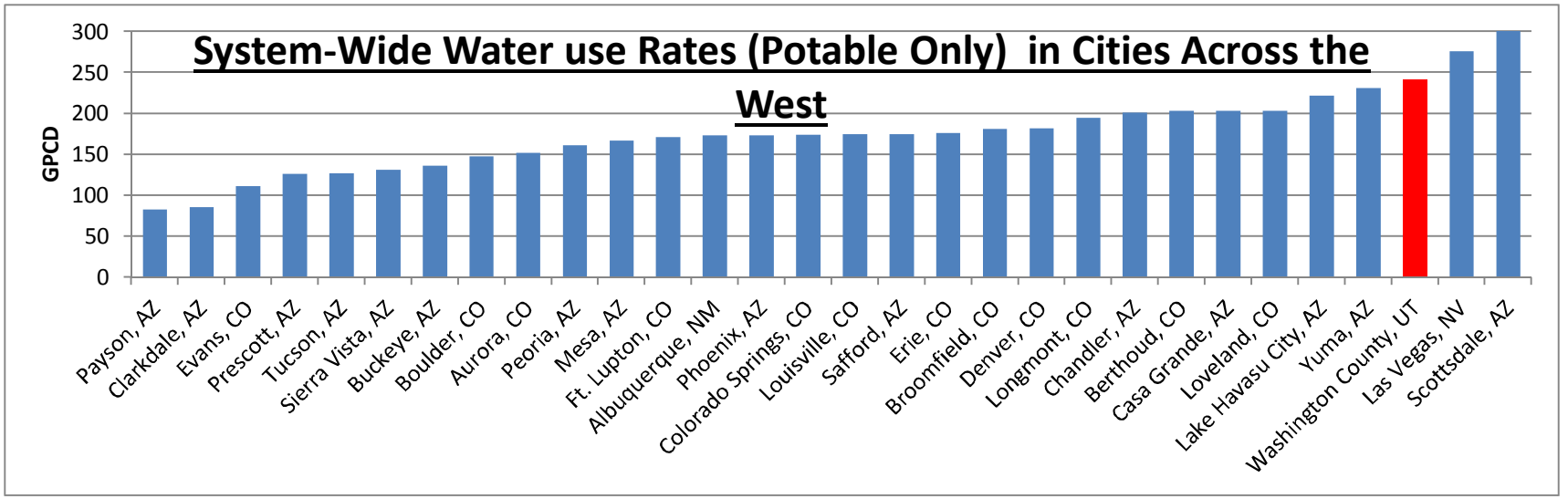

Figure 4. Washington County's average system-wide water use in 2010 is among the highest of 30 communities in the West. These rates of water use are measured in gallons per capita per day (gpcd), and represent potable water used in the residential, commercial, institutional and industrial sectors.

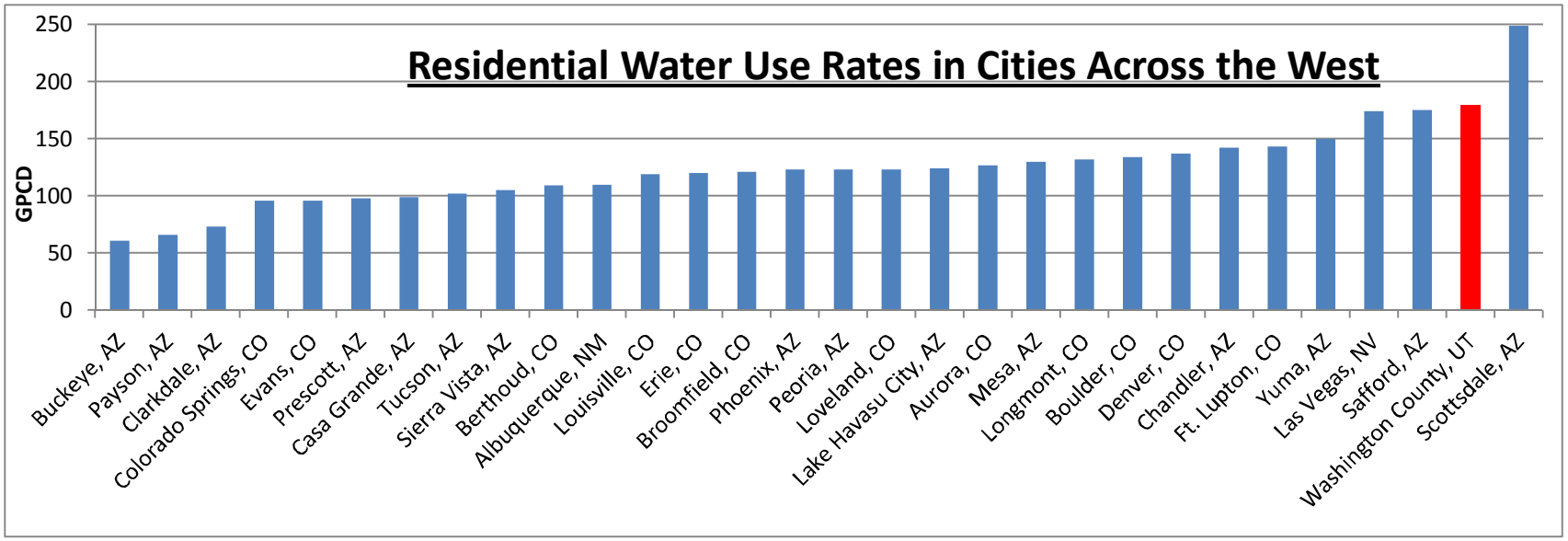

Figure 5. Washington County's average residential water use is second highest when compared to residents in 29 other communities in the West. These rates of water use are measured in gallons per capita per day (gpcd), and include both potable and non-potable water.

The Local Waters Alternative would have Washington County achieve a system-wide total water use rate of 176 gpcd by 2060. This implies a system-wide *potable* water use rate of 118 gpcd, and a residential water use rate of 90 gpcd, based on Table 3. This would place Washington County's system-wide potable use near the low-end of current water use rates in the west, just below Prescott in Figure 4, and this residential water use rate would place the County be just below Colorado Springs in Figure 5. Washington County would achieve these levels of water use over the course of 50 years, whereas these cities have achieved this a few years ago. If instead Washington County adhered to their own proposed conservation rate, in 50 years they would have water use rates higher than 70% of the cities portrayed in Figure 4 and Figure 5.[21]

Table 3. An example of how system-wide 176 GPCD water use rates could be distributed across all sectors. This hypothetical allocation is based on the distribution of water as reported in the DWRe 2005 Kanab Creek/Virgin River M&I Water Use Report, but total residential water use is fixed at 90 gpcd and culinary and secondary demands have been balanced to reflect the proposed supply portfolio (roughly 70% culinary, 30% secondary).

1% Conservation Scenario – 176 gpcd in 2060			
	Culinary	Secondary	Total
Res Indoor	35	0	35
Res outdoor	25	30	55
Commercial	35	15	50
Institutional	20	13	33
Industry/stock water	3	0	3
Subtotals	118	58	**176**

Despite the preponderance of data suggesting that Washington County does in fact have high water use, the Washington County Water Conservancy District (WCWCD) has claimed that such comparisons are not appropriate for two main reasons, which are addressed here:

- Washington County claims gpcd comparisons are unfair because 27% of their water users are seasonal residents, and thus not accounted for in the permanent population.
  - After adjusting for the seasonal population, the County's water use rates are still relatively high, compared to other cities. With this adjustment, Washington County's 2010 system-wide potable use would be 205 gpcd (between Loveland and Lake Havasu City in Figure 4) and the total residential use would be 138 gpcd (between Denver and Chandler in Figure 5). It should be noted that none of these cities make similar adjustments, even though some of them also have seasonal populations (e.g. university students, second homes, etc.). Additionally, because these data are several years old

[21] Assumes the ratio between users and potable and non-potable water remains the same, as was assumed in Draft Study Report 19.

(from 2006 and 2008), many of these cities have reduced their water use rates below what is reported in both figures.

- Washington County suggests its hot, dry climate makes GPCD comparisons unfair.
  - Several cities have similar, or even drier and hotter, climates and still use less water, as documented in Appendix C. Moreover, hotter and drier temperatures have little impact on indoor use, which accounts for a significant percentage of total annual use.

For these reasons and others explained in Appendix C, special adjustments are not made for Washington County's rate of water use in subsequent calculations and comparisons. The following section explains in detail the feasibility of attaining 90 gpcd in the residential sector.

90 GPCD in the Residential Sector

Setting a target of 90 gpcd for residential water use (indoor and outdoor) by 2060 is a realistic goal that will require a sustained, long-term effort, yet will not require onerous lifestyle changes or landscape modifications beyond those already implemented in many communities across the Mountain West, including many in Washington County. Published literature and technical studies indicate that a 35 gpcd indoor residential goal, and a 55 gpcd outdoor residential goal, can be achieved within the next 50 years *with current technologies and practices*. If water conservation technologies further improve by 2060, these residential gpcd targets will be conservative.

Indoor Residential Water Use Target: 35 gpcd

Because people typically do the same things inside a home, (cook, clean, wash clothes, shower, etc.), the variation of indoor residential per capita water use across the U.S. is low. Indoor water use is commonly determined through end-use studies, where data loggers are used to record flows through a household water meter in short time increments (10 seconds or less). These data can then be processed in a way that identifies which fixture or appliance in the home was using the water. By logging multiple homes over an extended period of time, a water provider can estimate the amount of water used by residential customers for various purposes.

One recent end use study conducted by Aquacraft found that new homes built with fixtures and appliances using the best available water efficiency technology (similar to those built to EPA WaterSense New Home specifications) *currently* achieve an indoor GPCD of 36.[22] Existing homes can also reduce their current water use to 35 gpcd through existing retrofit technology.

In 2011, the Albuquerque Bernalillo County Water Utility Authority (Albuquerque) conducted a retrofit study of single-family high water users to estimate the conservation potential of high

[22] Aquacraft. 2011. *Analysis of Water Use in New Single-Family Homes*. July 20. Accessed October 2, 2012. http://www.aquacraft.com/node/64.

efficiency retrofits and appliances. Albuquerque found that its single-family residential high water users achieved a water use rate of 31 gpcd after implementing a retrofit program.[23]

In addition, the State of Colorado's Statewide Water Supply Initiative (SWSI) established a 35 gpcd goal for indoor residential water use under their medium conservation strategy. SWSI's conservation study describes the methodology to achieve this level of savings, and provides extensive documentation that supports this demand reduction strategy.[24] Thus, numerous studies show that a 35 gpcd target for indoor water use is achievable with *current* technologies and practices. Taking into account that these technologies and practices are expected to improve in the next 50 years, a 35 gpcd target for indoor single-family residential water use is not only achievable, but a conservative goal for Washington County in 2060.

Outdoor Residential Water Use Target: 55 gpcd

Single-family homes in Washington County can reasonably achieve outdoor water use of 55 gpcd and have a lush, vibrant landscape. Provided here is a design for an outdoor landscaped area of average size for a single family residential home in Washington County - 6,500 sq. ft. – with an average household population of 2.8 people.[25] Notably, as the population grows in Washington County it is likely that lot sizes will decrease, making this outdoor water target even easier to achieve.

The landscape plan has 600 sq. ft. of turf (i.e. grass), plants from the Washington County Plant List, and includes permeable hardscape design such as stone walkways and communal areas that allow rain water to filter slowly into the ground (see Table 4 and Figure 6). The Washington County Plant List provides many beautiful native and climate-appropriate trees, shrubs, and perennial flowers that can provide a beautiful landscape ideally suited to the region's ecology. Native and climate-appropriate plants are self-sustaining, and support beneficial insects, pollinators, and native birds that are critical to the region's unique desert ecosystems. Generally, the evolutionary adaptations of these plants also makes them better able to withstand extreme weather events, and results in fewer chemicals needed to fend off pests and disease.

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[23] Aquacraft. 2011. Albuquerque Single-Family Water Use Efficiency and Retrofit Study. December 1. Accessed October 2, 2012. http://www.aquacraft.com/sites/default/files/pub/Aquacraft-(2011)-Albuquerque-Single-Family-Water-Use-Efficiency-and-Retrofit-Study.pdf.

[24] Colorado Department of Natural Resources, Colorado Water Conservation board. 2011. "Appendix L – SWSI 2010 Municipal and industrial Water conservation Strategies." In *Colorado's Water Supply Future, Statewide Water Supply Initiative 2010*. Denver, CO. January. Accessed October 2, 2012. http://cwcb.state.co.us/watermanagement/watersupplyplanning/Documents/SWSI2010/Appendix%20L_SWSI%202010%20Municipal%20and%20Industrial%20Water%20Conservation%20Strategies.pdf.

[25] US Census Bureau. American Fact Finder. DP04-Selected Housing Characteristics: 2006-2010 American Community Survey 5-Year Estimates, Washington County, Utah. The median cost of a single family residence in Washington County is $240,900. The average landscaped area for single family residences (6,600 sq. ft.) in Washington County was calculated by averaging the non-built area of the lots of houses for sale in Washington County (September 6, 2010, http://www.utahhomes.com/Property/PropertySearch.aspx) within the price range of $240,000 - $250,000.

Drip irrigation is featured in this design. It results in the use of 4,625 gallons of water per month, and these watering requirements relate to post-establishment of the landscape (i.e. water needed during installation of the landscape is not included in the GPCD calculations). Drip irrigation (and its maintenance) for the turf area is assumed to be an economically viable alternative to a fixed automatic spray or rotor irrigation system that would be installed by a licensed landscape contractor.[26] The EPA's GreenScapes cost calculator was used to estimate the water requirements and compare the cost of irrigating this landscape with a sub-surface drip irrigation system with a rain shut-off valve, and with a traditional sprinkler system. Using this calculator, an average a drip irrigation system uses 60% less water per year and is cost competitive when compared with a traditional sprinkler system.

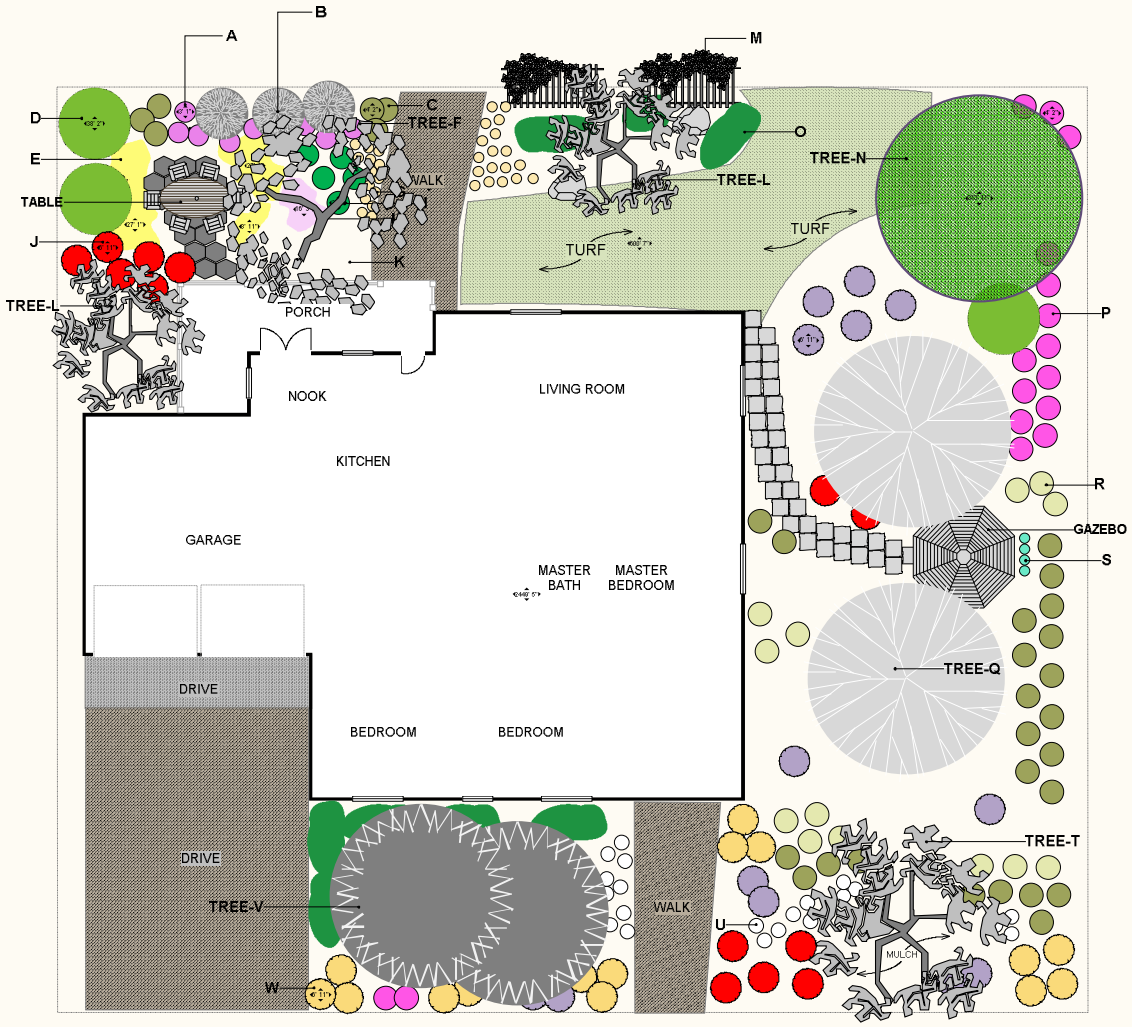
Thus, 90 gpcd - 35 indoor, 55 outdoor - for new and existing homes is an entirely feasible option that does not necessitate the virtual elimination of residential outdoor watering, as proposed in Draft Study Report 22: Alternatives Development.[27]

Table 4. Outdoor water use at a rate of 54 gallons per person per day is achievable under landscape Scenario 1. This is even lower than the proposed level under the Local Waters Alternative.

Plant Type / Landscape Feature	Area[a] (sq.ft.)	Water Use[b]	Irrigation Type	Required Water (gal/month)
Turfgrass	600	Low	Drip-Press Comp	2,746 [c]
Shrubs & Perennial Flowers	814	No-Low	Drip-Press Comp	1,225 [c]
Trees	2,179	No-Low; Low	Drip Irrigation	654[d]
Mulch	3,386	NA	NA	0
Permeable Hardscape	1,700	NA	NA	0
			Total Water Required	4,625

[a]The total area is 6,500. However, the summation of all listed areas is larger due to the overlapping tree canopies.
[b]Plants and water use categories from Washington County Plant List (Updated March 31, 2010).
[c]Monthly landscape water requirement is based on the peak watering month for St. George, UT, assuming an average monthly reference ET of 11.09 inches/month, and an average monthly rainfall for the peak watering month of 0.18 inches/month. All calculations made with the EPA Water Budget Tool (V 1.01) for the WaterSense Single Family New Home Specification.
[d]Drip irrigation calculations are based on irrigating 5-6 inches/sq. ft./season the whole mature plant area of the desert trees (diameter of crown diameter squared x 0.7854) minus the area extending 3 feet from the base of the trees, using a 90% efficient drip system.

[26] A fixed automatic spray or rotor irrigation system, installed by a licensed landscape contractor, is required in all new developments in St. George under the St. George Landscape Standards Ordinance. ST. GEORGE, UTAH, CODE §§ 10-25-3(C)-(D).
[27] Utah Board of Water Resources. 2011. Draft Study Report 22: Alternative Development. pg 3-6.



PLANT LIST			
KEY	BOTANICAL NAME	COMMON NAME	QTY
A	Penstemon palmeri	Palmer's Pestemon	9
B	Juniperus x pfitzeriana 'Sea Green'	Sea Green Juniper	3
C	Dalea pulchra	Indigo Bush	30
D	Vauquelina californica	Arizona Rosewood	3
E	Coreopsis sp.	Coreopsis	60
F	Robinia ambiqua idahoensis	Idaho Locust	1
G	Muhlenbergia rigens	Deer Grass	32
H	Chrysothamnus nauseosus	Rabbitbrush	5
I	Oenothera sp.	Evening Primrose	36
J	Hesperolae parviflora	Red Yucca	14
K	Perovskia atriplicifolia	Russian Sage	13
L	Acacia smallii	Sweet acacia	2

PLANT LIST			
KEY	BOTANICAL NAME	COMMON NAME	QTY
M	Wisteria sinensis 'Texas'	Texas Wisteria	2
N	Chitalpa tashkentensis 'Pink Dawn'	Chitalpa	1
O	Juniperus media "Holbert"	Holbert Juniper	8
P	Leocophyllum frutescens	Texas Ranger	20
Q	Prosopis glandulosa	Honey Mesquite	2
R	Atriplex canescens	Fourwing Saltbush	13
S	Juniperus scopulorum 'Skyrocket'	Skyrocket Juniper	4
T	Cercidium 'Desert Museum'	Desert Museum Palo Verde	1
U	Lepidium fremontii	Fremont's Primrose	24
V	Pinus eldarica	Afghan pine	2
W	Coraderia selloana 'Dwarf'	Dwarf Pampa Grass	15

Figure 6. Landscape design for an average home in Washington County, based on a water use rate of 54 gallons per person per day. This design features native, low-water use plants and a small area of turf.

86 GPCD in the Commercial, Institutional and Industrial Sector

The commercial, institutional and industrial (CII) sector comprises the remainder of water demands in the county. Very little data is available regarding efficient levels of water use in this sector, for a number of reasons. First, every municipality has a different mix of businesses, industries and institutions, each of which exhibits different water use patterns. Secondly, many private businesses do not like to publicize data about their operations voluntarily, and so data is generally unavailable. However, one can infer from the data provided in Figure 4 and Figure 5 that this is a reasonable target because Washington County's *future* system-wide use would be at the low-end of how cities are using water "today". A more detailed study of water use patterns in the CII sector in Washington County would help to inform this 86 gpcd projection, and would also help the county as they plan for a strong economic future.

Implementation Pathways

This section outlines a few key conservation measures that will strengthen current initiatives already underway, with the intent of achieving a system-wide water use rate of 176 gpcd. All major cities in Washington County have made significant reductions in their system-wide and residential water use over the past decade. Although the County may have captured some "low-hanging fruit" (i.e., the easiest and cheapest conservation measures), numerous conservation strategies have yet to be utilized, all of which will create continued reductions in water use.

WCWCD contracted with Maddaus Water Management to review conservation program options, costs and benefits. [28] Based on this analysis, WCWCD adopted the mid-level program, which is a list of 25 indoor and outdoor conservation measures, known as Program B. Given this list it seems likely that the County will exceed their modest conservation target (i.e. use even less water). However, in addition to this list of programs, the following four key measures will embed water conservation into the structure of the community, beyond basic appliance replacement incentives and education efforts. Specifically, it is recommended that Washington County water providers and cities:

1) Implement an increasing block conservation rate structure, or improve existing rate structures, to send a stronger price signal to customers;
2) Meter all water - culinary and secondary - so that providers can document and track where water is used. With this information, utilities can identify leaks or other sources of unaccounted for water, and develop the most effective conservation programs appropriately targeted at the residential, commercial, industrial and institutional sectors;
3) Embed water efficiency into public spaces and new developments; and,
4) Implement smart growth principles.

[28] MWH. 2011. Lake Powell Pipeline Study: Water Needs Assessment. Draft Study 19. Prepared for Utah Division of Water Resources. Pg 5-13.

The first two are directly controllable by municipal water utilities servicing their customers. The latter two require cooperation with local, and perhaps state, planning agencies. In all cases, the WCWCD can play a helpful and pivotal role in the success of each measure.

Recommendation 1. Implement Conservation-Oriented Rate Structures

Effective conservation rate structures feature a low, affordable rate for the first block of water use, which typically covers the amount of water used indoors, and then increases the rate substantially for subsequent volumes of water used, sending a strong signal to customers about the value of water. This has been a key strategy for reducing water use in western communities; water rates are one of the most effective - and cost effective[29] - conservation measures. Moreover, this is a low/no cost strategy to encourage conservation, and bolsters a utility's ability to encourage conservation practices and use of water-efficient devices. When designed properly, conservation rate structures also provide a stable revenue stream for the utility.

WCWCD has implemented a conservation oriented block rate structure. However, its effect is weakened significantly because: 1) about half of WCWCD's revenue is derived from property taxes, which effectively subsidizes the cost of water, keeping the price per gallon very low[30], and 2) WCWCD is primarily a wholesaler, and *conservation oriented* block rate structures have not been replicated by the largest city, St George, nor by the cities of Santa Clara, Hurricane, Ivins, La Verkin, Leeds, Virgin and Washington.[31] Although most of these cities have adopted "increasing block rate structures", they are not *conservation oriented*, in that they are not yet designed to provide an adequate price signal when a customer uses excessive amounts of water. Figure 7 illustrates the difference between these kinds of rate structures. The marginal price indicates the cost for each 1,000 gallons of water used, across increasing levels of water use, up to a maximum of 50,000 gallons per month. St. George, Santa Clara and Hurricane have relatively flat rate structures compared to Tucson and the WCWCD. Flat rate structures do not send a price signal to customers when they use large amounts of water. This is in direct contrast to residents of Tucson, AZ, for example, whose customers see the average price of water increase significantly as their water use increases.

[29] Mayer, P. 2009. Cost/Benefit Analyses for Water Conservation Planning. Presentation to Colorado WaterWise Conference: The Water Conservation Yardstick, April 2-3.
[30] The Utah Taxpayer Association. 2011. The Utah Taxpayer. Vol 61.
[31] MWH. 2011. Lake Powell Pipeline Study: Water Needs Assessment. Draft Study 19. Prepared for Utah Division of Water Resources. pg 5-7 & 5-8; http://www.ivins.com/utilities/business-license/128-utility-rates ; http://www.laverkin.org/attachments/082_fee%20schedule%20update%20080211.pdf ; http://www.leedswater.com/RATES_FEES.html ; www.virginutah.org/UTILITIES.html ; http://washingtoncity.org/services/index2.php?sub=FeeSchedule&key=3.

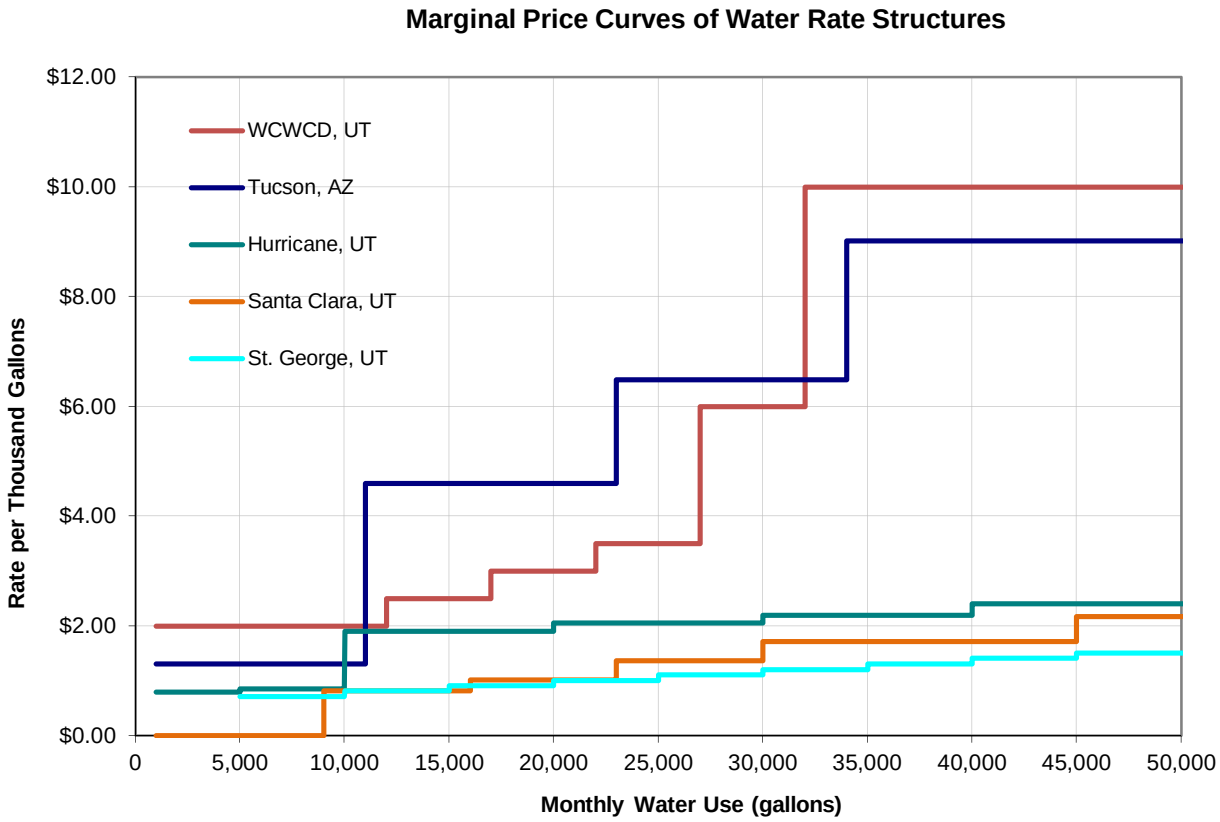


Figure 7. The price structures of water in St. George, Santa Clara, and Hurricane UT are relatively flat and do not send a price signal to customers when they use excessive amounts of water. This is in contrast with a conservation oriented rate structure, like in Tucson, AZ.[32]

Another way to see the effect of rate structures is to look at the average price curve, which is the average cost per 1,000 gallons and factors in the fixed price as well as the variable rate structure. A conservation oriented rate structure would result in the average price per gallon going up as consumption increases, communicating to the customer that the more water they use, the more expensive each gallon of water becomes. The communities of St. George, Santa Clara and Hurricane however do not have conservation oriented rate structures, and so the average price per gallon actually decreases or remains flat as more water is used sending no "price signal" to the customer.

[32] Tucson Water 2009 water rates.

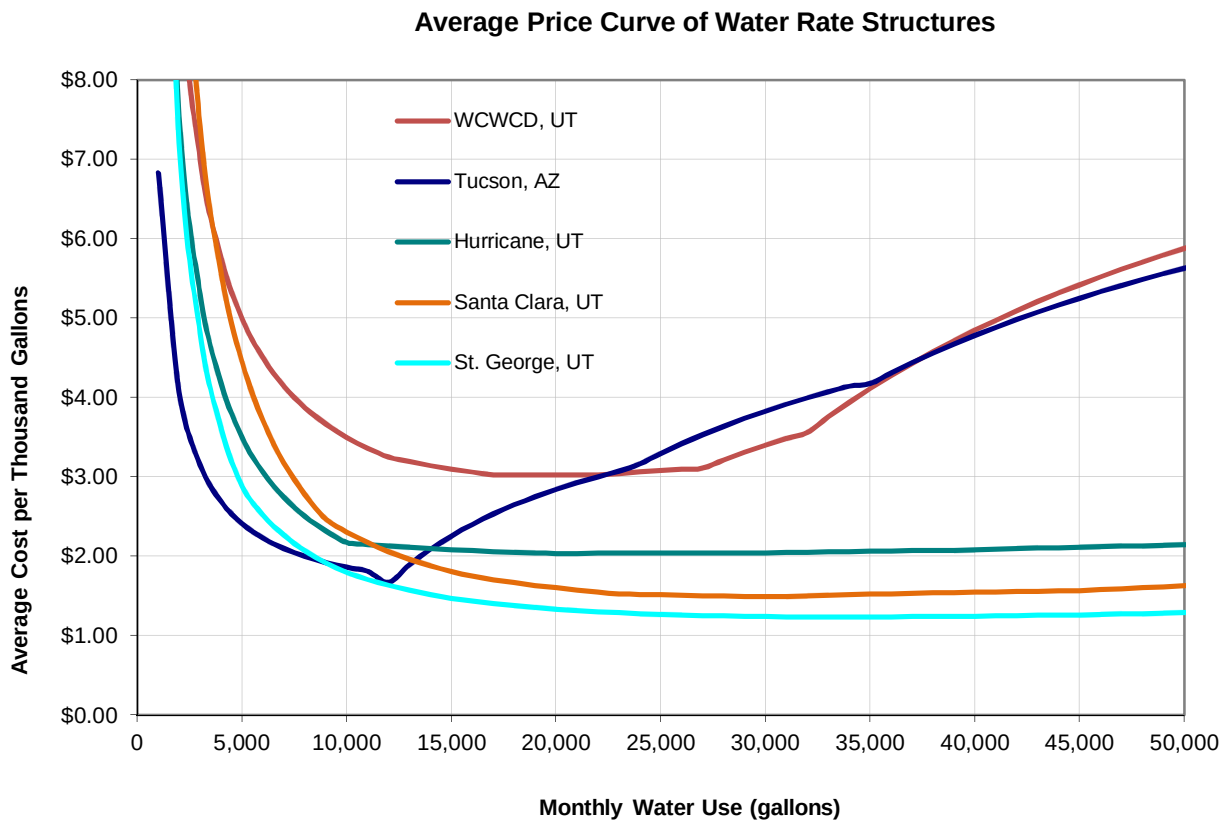


Figure 8. The average cost of water for residents in St. George, Santa Clara and Hurricane discourages efficient water use. The average costs decrease or remain flat as consumption increases (above 10,000 gallons per month). In contrast, WCWCD and Tucson, AZ price structure result in the average cost per 1,000 gallons going up as consumption increase above 10,000 gallons per month.

Recommendation 2. Meter & Report Culinary & Secondary Water

Metered data is a critical component of effective water conservation. There are significant short-comings in data reported by Washington County, signifying the need for accurate water use. Accurately metering and reporting water use data is a good business practice and necessary for designing equitable rate structures, designing effective conservation programs and detecting water losses. Detailed data on water use will not only enhance water utilities' understanding of where and when water is used, but it can also identify the largest users, creating the opportunity to achieve the largest gains in efficiency. In addition to retaining this information at the utility level, customers can be provided information about their own use in comparison with others' use to inspire water and financial savings.

The importance of metering systems was clearly demonstrated by Denver Water in Colorado, which estimated that 44 percent of the water savings they achieved in 1999 was attributed to their universal metering program.[33] Metering programs can help to reduce leakage in the system as well. In one example, water losses in Tucson moved from 12.5% down to 9%, saving about 4,000 AFY after several years of monitoring and metering. [34] Water loss management is almost always cost-effective because it not only reduces non-revenue water (water treated by the provider but no one pays for), but also saves the energy that was used to pump and treat that lost water.

At the most basic level, every water customer in Washington County should be metered. While this may seem obvious (for billing purposes), this kind of data was not aggregated and furnished for the benefit of the study plans for the Lake Powell Pipeline. New multi-family units (e.g. apartments) should also be sub-metered, and ideally secondary water should be metered as well. Automatic Meter Reading and Advanced Metering Infrastructure (AMR/AMI) is one widely used method that can take many different forms, and is recommended for its ease and the frequency with which data can be collected.

Recommendation 3. Embed Water Efficiency into Public Spaces and New Developments

Well-designed and properly managed water efficiency standards can play a unique role in achieving water use reductions. Because outdoor watering accounts for a significant amount of water use in Washington County (estimated to be 60% in 2005[35]), it should be a primary area of focus. Municipalities can determine the way public spaces are managed and how new developments are designed, and water providers can help shape and influence these land use decisions. Many stakeholders may be engaged with this process, such as water providers, elected officials, city planners, private industry and the general public. As the primary water provider for Washington County, WCWCD can help build consensus among the municipalities to increase water efficiency, for example by adopting effective ordinances. St. George has helped to set a precedent in the County by enacting the Landscape Standards Ordinance[36] but much more can be done. Importantly, ordinances are a relatively low-cost method to achieve water savings. The following list provides examples from other regions where water efficiency has been embedded into public spaces and new developments through standards or ordinances: [37]

- Low Water Use Landscaping Standards in Public Areas
- Water Tampering/Water Waste Restrictions

[33] Maddaus Water Management, Inc. (prepared for Denver Water), *Qualitative Review of Water Conservation Program*, May 2001, at 1-8.
[34] http://cms3.tucsonaz.gov/water/ and personal communications.
[35] Utah Division of Water Resources. 2005 Kanab Creek/Virgin River M&I Water Use Report.
[36] St. George City Code, Title 10 Chapter 25.
[37] WRA. 2010. Arizona Water Meter: A Comparison of Water Conservation Programs in 15 Arizona Communities.

- Plumbing Code Standards (beyond the 1990 Uniform Plumbing Code)
- Water Features/Water Intensive Landscaping Limitations
- Model Home Landscape Requirements (for new residential developments)
- On-site Graywater/Water Harvesting Requirements
- Car Wash Recycling Requirements
- Landscape Watering Restrictions
- Hot Water Recirculation Device Requirements
- Non-Residential Landscape Water-Use Efficiency Standards
- Water Use Plans for New Large Non-Residential Users
- EPA's WaterSense New Home Specifications

Recommendation 4. Implement Smart Growth Principles

The way in which a community grows can have a significant impact on future water demands. New, denser developments place much less demand on water distribution systems than traditional suburban development with large irrigated areas. Vision Dixie is a collaborative planning effort that incorporated a number of smart growth principles, with an explicit goal of relieving high water demands. Efforts such as these serve as a model to city and county planners, and should be looked to for guidance in urban planning.

Another example of a smart growth development is the Community of Civano that was built in in Tucson, Arizona. It was designed to be aesthetic, community oriented, and water and energy efficient. Residents there use an average of 52 gpcd of potable water and 25 gpcd of reclaimed water.[38] Thus, developers in Washington County can also play a significant and positive role in shaping the efficiency of new homes built in the region.

Summary of the 1% Conservation Alternative

In summary, the 1% 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.

[38] Western Resource Advocates. 2003. Smart Water: A Comparative Study of Urban Water Use Efficiency Across the Southwest.

C. Future Supplies

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% 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 over time 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.

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	

Importantly, if 116,300 AFY are developed then the percent of potable water to total water (about 67%) is lower than it was in 2005 (about 82%). If 138,000 AFY are developed (though additional water from agriculture), then the percent of potable water supplies drops to 57% because most agricultural water is secondary quality. However secondary water can be treated to potable levels, blended with potable supplies, or allowed to percolate into the ground, recovered and then treated. Yet another option is to expand secondary water uses in outdoor irrigation, since culinary water is often used currently. This would require expansions of secondary delivery systems, and many such plans are already in place in a numbers of towns in Washington

County.[39] Given that the County was initially planning on over 27,000 AFY of reuse water,[40] expansion of such systems is a feasible option.

Reuse

The Local Waters Alternative's projected volume of reuse is less than the project applicant's projected volume because this Alternative reflects both the change in water use habits as a result of the proposed higher level of conservation (35 gpcd indoors) and the revised population estimate. Reuse water in Washington County would come from all the communities identified in Draft Study Report 19 that currently are, or can be, served in the future: St. George, Washington, Santa Clara, and Ivins.[41] This analysis assumes that 90% of water used indoors returns to the system as wastewater and would be treated at a reuse treatment plant,[42] and that small volumes of water used indoors in commercial buildings could be reused.[43] This results in an estimated 16,900 AFY of reuse water in the year 2060. Current reuse levels are an estimated 3,900 AFY, and the St. George Regional Water Reclamation Facility's capacity is 7,800 AFY. An expansion of this plant could result in a capacity of 11,200 AFY, and it is stated in Draft Study Report 19 that any water beyond this volume would require an additional treatment plant.[44] Since the Local Waters Alternative proposes developing 3,300 AFY of reuse water beyond the current treatment plant capacity, it is likely that another plant would be needed. This new plant would also have been built under the original projections by WCWCD, since their projected volume of reuse water was over 34,900 AFY in 2060.

Agricultural-Urban Water Transfers

The volume of water available from the conversion of agricultural lands was estimated in Draft Study Report 19 to be 10,080 acre feet per year by 2060. However, there are numerous data inconsistencies related to this estimate, as explained in Appendix D. Thus, this estimate is revisited under this Alternative, resulting in an estimated 13,600 acre-feet per year by 2060. Draft Study Report 6: Land Use Plans and Conflict was also revisited to estimate the amount of land (in acres) needed to accommodate the future population under the most recent projection scenario. The results show that the land needs are greater than the amount of land that is readily

[39] MWH. 2011. Lake Powell Pipeline Study: Water Needs Assessment. Draft Study 19. Prepared for Utah Division of Water Resources. Section 4.1.5.4 Potential Secondary Water Systems.
[40] Ibid. pg ES-16.
[41] MWH. 2011. Lake Powell Pipeline Study: Water Needs Assessment. Draft Study 19. Prepared for Utah Division of Water Resources. Table 4-6, pg 4-50.
[42] The communities listed represent 75% of the population in the county today, and the same ratio is assumed in the future. 35 gpcd is a conservative rate of indoor water use, and 90% of indoor water use was assumed to be available for reuse due to losses though consumption and evaporation.
[43] A very conservative rate of one minute of faucet use and one toilet flush per capita per day was assumed in the commercial sector, to account for bathroom and kitchen area uses.
[44] MWH. 2011. Lake Powell Pipeline Study: Water Needs Assessment. Draft Study 19. Prepared for Utah Division of Water Resources. Pg 4-31 and pg. 6-4.

available to be developed, without conflict. A "conflict" indicates that a parcel of land is suitable for more than one land use (e.g. urban development, agriculture, or conservation). Thus there is a possibility that more agricultural lands will need to be converted to accommodate future population growth than was predicted. Importantly, this analysis provides a connection between Studies 6 and 19 so that the impact of future growth onto agricultural lands is connected to the water made available from that conversion. In contrast, the project applicants made no connection between the results of these two studies.

Revised Estimate of Water from Agricultural Lands

Draft Study Report 19 presented inconsistent data regarding the water available from agricultural land conversion, therefore this volume is re-calculated. Draft Study Report 19 initially estimates that 3,840 acres of agricultural land will be converted between 2005 and 2060, producing 17,290 AFY. However, in the reported planned future water supplies, only 10,080 AFY are presumed available, and this inconsistency is not explained. Thus, it is more reasonable to account for the water that is expected to be derived between 2010 and 2060, approximately 3,020 acres which results in about 13,600 AFY based on the "duty of water" methodology used in Draft Study Report 19. The duty of water is the average amount of water applied to an acre of crop – estimated to be 4.5 acre-feet of water per acre. See Appendix D for more on the duty of water, and for all calculations in this section. This 13,600 AFY of water, in combination with all other future water supplies, will slightly exceed projected demand in 2060, under the Local Waters Alternative.

Land Use

Draft Study Report 6 modeled a total of seven land development scenarios to quantify the area of land needed to accommodate future population growth, and to quantify the acreage available from undeveloped lands, conservation lands and agricultural lands. [45] The scenarios modeled different levels of housing density, and included or excluded development on hazardous rock and soil types. This analysis has been revised to reflect the latest population projections, and features the scenario that incorporates smart growth and excludes development onto hazardous rock and soil areas. (See Appendix D for details).

The revised analysis shows that a total of 57,500 acres will need to be developed by 2060 to accommodate the future population, however only 45,500 acres were identified as developable without conflict. Thus, the remaining 12,000 acres could be developed from lands that are suitable to both urban development and agriculture or natural conservation areas.[46] Of the

[45] Utah Board of Water Resources. 2011. Draft Study Report 6: Land Use Plans and Conflicts. Pg 2-5.

[46] According to Draft Study Report 6, a few hundred acres of land that are well suited to conservation protection areas are also suitable for agricultural or municipal interests, but since the area is relatively small, it is not included here.

12,000 acres need for development, 3,020 acres will come from agriculture and the remainder (8,980 acres) could come from agricultural lands, conservation lands, growth onto hazardous rock and soil regions, denser development than was modeled, or some combination thereof.

The manner in which land will be developed is uncertain, but there are indications that more agricultural land conversions will take place than was estimated in Draft Study Report 19. Past trends show that the rate of agricultural land conversion in Washington County was more than 3 times faster than the State's predicted rate.[47] Despite this, Draft Study Report 19 relies on the State's same predicted rate of conversion through 2060. So, this Alternative assumes that 3,020 acres of agriculture is the minimum acreage that will be converted.

Additional Water from Agricultural Lands

It is plausible that even more agricultural lands will be developed. This alternative characterizes any water above the 13,600 AFY as "potential" additional agricultural water, which can help to provide a buffer around predicted demands. Some water utilities plan for a 20% buffer around demands, and in this case it would be achieved by converting an additional 4,800 acres of agricultural lands such that it provides 21,600 acre-feet of water. This would bring total supplies from agricultural conversions up to 35,200 AFY, and would require a total of 7,800 acres. In 2007, 13,810 acres of agricultural were said to exist.[48]

It is important to bear in mind that the permanent conversion of agricultural lands, often referred to as "buy-and-dry," is not the only option. The county could develop more densely and reduce the number of acres permanently converted from agriculture. In addition, municipalities can lease water on a temporary or interruptible basis from agricultural water rights holders instead. In recent years, growing cities throughout the West have acquired agricultural water through long-term leases, short-term "dry year" leases, interruptible supply agreements, long-term rotational fallowing agreements (leases), water banks, deficit/partial irrigation practices, and alternate cropping types.[49] Appendix E provides examples of these types of cooperative agreements in more detail. These water sharing agreements are becoming more common in the West because of the benefits they offer over traditional "buy and dry" practices. Specifically, they can provide reliable water supplies to growing cities while providing farmers with financial stability.

[47] In Draft Study Report 19, one projection of agricultural land conversion was based on the Utah State Water Plan's projected agricultural-land conversion rate, 0.54 % per year, from 1990 through 2040. However it is not mention that between 1990 and 2007 the rate of agricultural conversion was 1.66%, more than 3 times higher. The result is the predicted number of acres to be converted by 2040 was already exceeded in 2007.

[48] MWH. 2011. Lake Powell Pipeline Study: Water Needs Assessment. Draft Study 19. Prepared for Utah Division of Water Resources. Pg. 4-42.

[49] CDM, 2011. Colorado's Water Supply Future Colorado Water Conservation Board Alternative Agricultural Water Transfer Methods Grant Program Summary, Final Report. May 2011.

IV. COST ANALYSIS

This section outlines the costs of the Local Waters Alternative and compares it with the Lake Powell Pipeline. The Local Waters Alternative is very likely to cost significantly less than the proposed pipeline, though this analysis is constrained by the limited data available for the cost of conservation, reuse and infrastructure. The present value cost of the Local Waters Alternative - which does not include necessary infrastructure costs - is estimated to be about one-third the present value cost of the pipeline, and every effort was made to be conservative in this estimate. Infrastructure and treatment costs for secondary water distribution (from reuse and agricultural water transfers) were not possible to reasonably estimate, however much of it would likely have been developed under the original pipeline scenario proposed by the project applicants. The following sections provide estimates of the cost of conservation (to the utility and customers), reuse, and agricultural water transfers. It concludes with a comparison of the total costs of the Local Waters Alternative and the Lake Powell Pipeline.

Importantly, pursuing additional water supplies in an incremental fashion is less financially risky for the utility, the financial backers, and the water customers. Utilities face a lot of uncertainty with respect to their future water supplies and demand forecasting. Supply uncertainties in Washington County includes drought and climate change, and demand uncertainty arises largely from the boom and bust cycles of population growth. The financial risk associated with these forecasts is greater if a single, large project is built. This approach could unduly commit residents to high repayment obligations if demands or supplies are very different than projected. In contrast, the flexible and incremental nature of the Local Water Alternative allows supplies to be developed in connection with demand, significantly reducing the financial risks associated with this alternative.

A. CONSERVATION

The cost of conservation was derived from information included in the Washington County Water Management and Conservation Plan, updated in 2010. Within this Plan, WCWCD included portions of commissioned study on water conservation program options and costs, which was developed by Maddaus Water Management. Because only portions of this study were included, the data available were limited. The data was adjusted to create an "apples-to-apples" comparison with the Lake Powell Pipeline, but it is worth noting the original results of this study, which estimates conservation to be about 1/3 the cost of the Powell Pipeline on an annualized per acre-foot basis:

> The average cost of water saved to the utility (present value basis) for all [conservation] programs ranges from a very attractive $92 to $122 per AF (less than the $620 projected

> price of the Lake Powell water)….The average community cost of water saved ranges from an attractive $261 to $447 per AF.[50]

A similar result was reported in Draft Study Report 10: Socioeconomics and Water Resource Economics, but strangely, no further explanation of the cost of conservation is provided:

> The marginal cost spread, for alternative water resources, is great, with some conservation features being under $250/acre-foot…. The NED base [Lake Powell Pipeline] Project costs, without power benefits included, suggest costs approaching$1,100/acre-foot.[51]

The analysis presented here reports the total costs of conservation in the Local Waters Alternative, unlike the above studies which annualize the cost per acre-foot. But to derive the total cost of conservation, the one-time cost to conserve one acre-foot of water was applied to every acre-foot of water saved, beyond what is already planned by Washington County. In Draft Study 19 Washington County reportedly anticipated conserving a little bit more than was originally mandated by the State (a 25% per capita reduction by 2050). This level of conservation will occur regardless of whether the Lake Powell Pipeline is constructed, so the cost to conserve this water is not included in the alternative cost. Only the additional water saved through more aggressive conservation measures is included in this analysis. Notably, the recent change in the State's conservation target (a 25% per capita reduction by 2025) will bring the County's conservation targets more closely in line with the Alternative's targets, thereby reducing the cost of conservation associated with the Alternative through 2025. However since the conservation goals beyond 2025 are unknown, this policy shift is not accounted for in the economic analysis.

Using the Maddaus conservation study, the estimated one-time cost to save one acre-foot is $3,824 for the utility, and $13,980 for the community, the latter of which includes costs to both customers and the utility. These conservation cost estimates are roughly in line with reported costs of conservation in Colorado, which range from about $5,000 - $10,000 per acre foot.[52] The one-time cost reflects utility administration, rebates, education, and customer expenses associated with purchasing water-efficient appliances or materials. The financial investment is a one-time occurrence, but it is assumed that the water continues to be saved every year through 2060. Appendix F explains the method in more detail.

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[50] Washington County Water Conservancy District. 2010. Water Management and Conservation. Appendix A, Section 7.

[51] Utah Board of Water Resources. Modified Draft Study Report 10. Socioeconomics and Water Resource Economics. February 2012. pg ES-2. These values reflect utility costs, community costs were not estimated.

[52] Colorado Water Conservation Board, 2011. "Appendix L – SWSI 2010 Municipal and Industrial Water Conservation Strategies" in Colorado's Water Supply Future, Statewide Water Supply Initiative 2010. Denver, CO. January.

All future investments in conservation were then discounted back to their present value in 2010. The same two discount rates that were used in Draft Study Report 10 are used here; the 4.14% discount rate reflects Utah's calculated real discount rate, and the 3% real discount rate reflects a social time preference.[53] The results are provided in the Table 5.

Table 5. The Local Waters Alternative estimates the cost of conservation to the community (which includes the utility and customers) is less than $300,000,000, in 2010 present value. The cost to the utility is significantly lower. All costs shown in millions.

Discount Rate	Utility Costs, 2010$	Community Costs, 2010$
3%	$83.0	$303.3
4.14%	$67.2	$245.8

B. Reuse

The Local Waters Alternative projects a total of 16,900 acre-feet of reuse water by 2060, which would necessitate building a new reuse facility with a capacity of about 10 million gallons per day (mgd). Although the construction of this type of facility is likely a part of Washington County's plans for the future (the County estimated developing upwards of 34,900 AF of reuse water), no cost estimates for building a reuse facility were provided in the Draft Study Reports. Draft Study Report 10 did estimate the cost to build a *reverse osmosis* plant, but this is a higher level of treatment and has a much higher capacity of 36 mgd. The estimated costs ranged from about $192 million to $362 million, which includes capital costs as well as operations, maintenance and replacement (OM&R) costs. This would be significantly more expensive, and therefore it is not an adequate proxy.

The Colorado Water Conservation Board's *Reconnaissance Level Cost Estimates Report* estimated the cost for reuse water on per acre-foot basis.[54] The higher cost estimate is used here - $13,500 per acre-foot as opposed to $7,000 per acre foot – and this reflects the cost to divert water, treat it to potable standards, and convey it locally. It results in an estimated cost of $151 million for a 10 mgd plant. Based on actual cost of other facilities and other estimates (see Appendix F), this appears to be a high but reasonable cost estimate. Notably, the cost to build the

[53] Utah Board of Water Resources. Modified Draft Study Report 10. Socioeconomics and Water Resource Economics. February 2012.

[54] CDM. 2010. *Appendix N - Reconnaissance Level Cost Estimates for Agricultural and New Supply Strategy Concepts.* Prepared for Colorado Water Conservation Board. June 4. http://cwcb.state.co.us/water-management/water-supply-planning/Documents/SWSI2010/Appendix%20N_Reconnaissance%20Level%20Cost%20Estimates%20for%20Strategy%20Concepts.pdf

reuse facility in St. George was attached to existing infrastructure and cost only $4.2 million.[55] With the increase in population, it is possible that a new waste water treatment plant would need to be built anyway, and a reuse facility could similarly be added on for a very modest cost. Estimating the cost of distribution infrastructure is difficult, but since $151 million is a high-end estimate, it may adequately account for those costs. Appendix F provides full details regarding these data.

The estimated annual O&M costs are 1.25% of capital costs, based on the relative O&M costs reported in Draft Study Report 10. The costs were applied over time, and discounted to 2010 present value. The estimated total cost to build a new reuse facility is below.

Table 6. The Local Waters Alternative estimates the cost to build and maintain a reuse facility is at most $150 million in 2010 present value. All figures are in millions of dollars.

Discount Rate	Capital & O&M Costs, 2010$
3%	$151.5
4.14%	$130.1

C. Agricultural Land Conversions

The Local Waters Alternative assumes that 13,600 acre-feet are highly likely to become available through agricultural land conversions, and as much as 35,200 acre-feet could become available through either land conversions or through water leasing. The cost to *lease* water was not assessed in Draft Study Report 10; only the cost of water in "water markets," which seems to be the cost to *purchase* water rights from rights holders. The water market cost estimate ranged from $2,500 - $5,000 per acre-foot, and so the average value was applied ($3750/AF). Importantly, the cost to lease water would likely be substantially lower. Again, these future costs are discounted back to 2010. This resulted in a total present value cost of $55.5 million under a 3% discount rate, and a cost of $34.4 million under a 4.14% discount rate.

There may be additional costs associated with new infrastructure to transport or distribute water coming from agriculture. In addition, treatment will be needed in some or all cases to bring water up to secondary standards. These costs are not estimated because the manner in which that might occur (e.g. by blending with cleaner water sources, utilizing existing treatment plants, etc.) is not known.

[55] Chandler. M., Ford, B. Water Reuse – a multifaceted resource. Presentation by Bowen Collins and Associates, and the City of St. George. https://pncwa.memberclicks.net/assets/2010ConfTechPresentations/Session09/2010%20pncwa-%20session%209-2%20-%20reuse%20-%20mike%20chandler.pdf Accessed November 7, 2012.

D. Lake Powell Pipeline

Draft Study Report 10 examined the cost of the Lake Powell Pipeline under four configurations and under two discount rates, for a total of eight cost scenarios. The simplest, least expensive configuration was chosen to ensure a conservative estimate. Moreover, only the portion of the project that Washington County will be paying for was considered, since this county is the focus of this alternative. Thus, the portion attributable to Iron County and Kane County was subtracted based on the State of Utah's Opinion of Probable Costs, released in 2008.[56] While this data is relatively old, no other source with equally detailed information was found. Under the lowest cost scenario (which includes O&M costs), the Washington County portion would be $1,512,800,000 under a 3% discount rate, and $1,261,300,000 under a 4.14% discount rate. These estimates include all costs identified in Draft Study Report10, such as capital costs and operations and maintenance, but does not include the cost to finance the project (i.e. interest and transaction costs) which will further increase the pipeline costs significantly.

E. Comparison of Costs

The estimated cost of the Local Waters Alternative is about one third the cost of the Lake Powell Pipeline. While there are some uncertainties and many assumptions embedded in this economic analysis, it clearly demonstrates that the proposed alternative is indeed worthy of consideration as a viable alternative. Conservative estimates were made throughout this economic analysis, such as taking the lowest cost of the pipeline and the highest costs of conservation and reuse. 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.

Table 7. The cost of the Local Waters Alternative is about 1/3 the cost of the Lake Powell Pipeline. All costs shown in millions.

	3% Discount Rate	**4.14% Discount Rate**
Community Conservation Costs	$294.4	$236.1
Reuse	$151.5	$130.1
Agriculture	$55.5 +infrastructure costs	$34.4 +infrastructure costs
Alternative Total	**$510.4 +infrastructure costs**	**$410.3 +infrastructure costs**
LPP	**$1,512.8**	**$1,261.3**

[56] Opinion of Probable Costs
http://www.water.utah.gov/lakepowellpipeline/projectupdates/June2008OPCCSummary%20r1.pdf

V. CONCLUSION

The Local Waters Alternative provides a pathway for Washington County to meet projected water needs in a flexible, local and cost effective manner through the year 2060. In using this approach, water managers will be able to exceed demands through a combination of conservation, reuse, and agricultural water transfers. Implementing an aggressive yet achievable water conservation program over the course of 50 years will result in a demand that is 27% lower than projected by the applicants. And, this could cost roughly two thirds less than the Lake Powell Pipeline. The Local Waters Alternative demonstrates the lack of need for this pipeline and the feasibility and cost-effectiveness of alternative supplies. This alternative should be included in the No Action Alternative in the forthcoming Draft EIS.

In addition, there are many deficiencies in the draft study documents that call into question the basic facts about Washington County's supplies and demands. These deficiencies are documented in detail in the Appendices. Here we summarize our requests for improved data and studies:

Critique 1: Draft Study Report 19: Water Needs Assessment does not provide reliable data on water use or water supply, and it contains errors and inconsistencies.

- **Measured water use data – potable and secondary water - should be submitted to FERC, to determine actual, current water usage, such as gpcd, throughout the County.**
- **Reliable and consistent water supply data for existing resources and future potential sources should be submitted to FERC.**

Critique 2: Draft Study Report 22: Alternatives Development does not examine a reasonable range of options, or reasonable combinations of options, and it predicated on an opaque cost-benefit analysis.

- **The cost of conservation should be analyzed in a manner consistent with other alternative supply options.**

Critique 3: Draft Study Report 6: Land Use Plans and Conflicts is not aligned with the presumed acres of agricultural lands that will be converted.

- **The area and types of land needed for future development should be in line with assumed acres of agricultural conversions.**

Critique 4: Draft Study Report 10: Socioeconomics and Water Resource Economics does not provide any detail about the cost of conservation except to say that it may be a little as 1/5 of the cost of the Lake Powell Pipeline.

- **Alternatives to the Lake Powell Pipeline should examine a broader range of combinations of supply option, such as what is provided in this Alternative.**

With a complete set of reliable and measured water data from Washington County, a fair assessment of the Purpose and Need for this project can be made. We formally request that the project applicants be required to provide better data and analyses in support of their application with FERC, and that the Local Waters Alternative be incorporated into FERC's No Action Alternative.

APPENDICES

The following appendices provide additional details regarding the data and information presented in this Alternative.

Appendix A: Water Supply Data Inconsistencies
Appendix B: Water Supply Estimation Critique
Appendix C: GPCD Analysis
Appendix D: Agricultural Land Conversion Calculations
Appendix E: Temporary Agricultural Water Transfers
Appendix F: Economic Analysis

APPENDIX A: Water Supply Data Inconsistencies

The data provided in Draft Study Report 19 Water Needs Assessment regarding current supplies in Washington County, UT is highly inconsistent. While it appears there may be ways to understand and correct the data presented, it is unreasonable to present such inconsistent data on current water supplies when claiming a need for additional water supplies. The reported water data from Washington County is inadequate.

The table below documents the variety of figures reported. In some cases, it seems that the terms "WCWCD" (Washington County Water Conservancy District) and "Washington County" were confused and used interchangeably, and these have been corrected.

Table A1. **The water supply data reported in Draft Study Report 19 is highly inconsistent, as shown here.**

	Reference #	Culinary	Secondary	Implied Total Supplies
Current **WCWCD** Water Supplies	1	33,550 (Table ES-10, Table 4-2*)	6,560 (Table ES-10)	40,110
	2	45,450 (Table 4-2**)	(assumed same as above)	52,010
Current **Washington County** Water Supplies	1	74,560 (Table ES-10†, Table 4-2†)	7,450 (Table ES-10)	82,010
	2	62,650 (Table 4-2)	(assumed same as above)	70,100
	3	--	--	75,990 (Table 6-2)

†This value can be found in text associated with the tables cites, either directly above or below the actual table.
* The value reported in Table 4-2 is actually 10 AFY higher, but this is assumed to be another error.
** This value was obtained by adding the two reported potable supplies in Table 4-2: 3,750 and 41,700 AFY.

Table 4-2 in Draft Study Report 19 provides the most comprehensive list of water supplies for Washington County, which is nearly an exact replication of Table 14 from the DWRe Kanab Creek Virgin River M&I 2005 report, though this is not explicitly stated in Draft Study Report 19. However, Draft Study Report 19 tallies the total surface water supplies as being 33,540, almost 12,000 AFY less than the correct summation. Secondly, the introductory paragraph states that total, reliable potable supplies in Washington County are 74,560, yet in the Table 4-2 states the total is 62,650. The larger number reflects the larger WCWCD estimate, and is reported throughout Draft Study Report 19 (pgs ES-15, 4-11). In one original source, the WCWCD *Water*

Management and Conservation Plan, updated in 2010, reports that available resources for the County are "approximately 83,910 AF per year."[57]

After detailed review of Draft Study Report 19 and the documents cited, it seemed that the primary discrepancy in Draft Study Report 19 arose from WCWCD's reported potable supplies. Draft Study Report 19 reports 33,550 AFY, yet the original studies from which these were data were derived[58] cite a potable water supply that is 10,000-12,000 AFY higher. Draft Study Report 19 states that 5,000 AFY from Sand Hollow Wells are now being reserved for critical drought periods, however no citation is provided and this is not mentioned even in WCWCD's 2010 Water Management and Conservation Plan. The remaining missing AFY are unaccounted for, but seem to reside somewhere in the Quail Creek and Sand Hollow Reservoirs system.

In addition, there is a discrepancy between supply data presented Draft Study 19 and 22. Draft Study 19 states that Ash Creek will provide 3,000 acre-feet per year, whereas Draft Study 22 states it will provide 5,000 acre-feet per year.[59] This discrepancy should be reconciled.

[57] Washington County Water Conservation District. 2010. Water Management and Conservation Plan. Pg. 6.
[58] Washington County Water Conservation District. 2010 Water Management and Conservation Plan; WCWCD Capital Financing Program Amended 2006; DWRe 2009 Municipal and Industrial Water Supply and Uses in the Kanab Creek/Virgin River Basin (data from 2005); DWRe 2009 State of Utah Municipal and Industrial Water Supply and Use Studies (data from 2005).
[59] Utah Board of Water Resource. March 2011. Draft Study Report 22 Alternatives Development. Pg 2-1

APPENDIX B: Water Supply Estimation Critique

The Utah Division of Water Resources (DWRe) developed an estimation methodology for reliable supply of surface and groundwater resources. The reliable yield of water is based on the lesser value of three criteria: hydrologic capacity of the water source, the physical capacity of the water system, or the amount allowed by the collective water rights.[60] This same methodology of water supply accounting was used in Draft Study Report 19. However, this methodology may significantly underestimate current and future supplies because in many cases the current physical capacity of the water system infrastructure is the limiting factor. Infrastructure can change, however, and should not necessarily be a proxy for reliable yield of water. This and other questionable estimation methods used in Draft Study Report 19 are described below.

Surface Supplies

All current surface supply volumes in Draft Study Report 19 were provided under a 90% reliability estimate. The method by which this 90% was determined in not explained (i.e. it could be 90% of historic average flows, or yield available 90% of the time, etc.). Moreover, given the DWRe's supply estimation methodology outline above, it is not clear which of the three criteria were used in determining the reliable supply. Draft Study Report 19 does not provide this information, nor is it explained whether the 90% was taken after the DWRe's reliable supply methodology was already applied. While the actual methodology used to estimate surface supplies may be valid, Draft Study Report 19 does not provide enough clear information to allow others to make that assessment.

Groundwater

According to Draft Study Report 19, the basin is already over appropriated and no additional groundwater withdrawals are planned for future supplies. Therefore, groundwater is only listed under current supplies. However, the groundwater data provided has some questionable assumptions regarding estimates of availability. Draft Study Report 19 states that the current, reliable supply from groundwater wells is calculated by taking one-half of the maximum capacity, and the wells or pumps are the limiting factor.[61] This therefore does not take into account the physical capacity of the aquifer to yield water, nor does it take into account the current rights held by the water provider. Thus, 50% of maximum yield "today" may significantly understate the potential future safe yield. Safe yield can be defined as an amount that can be withdrawn from an aquifer without negative effects such as decreased river flows, lowering of the water table, exceeding recharge rates, etc. Washington County Water Conservancy District's current ground water supplies are reported to be 6,750[62] and yet recharge

[60] DWRe. 2009. Municipal and Industrial Supply in the Kanab Creek/Virgin River Basin. (Data from 2005)
[61] MWH. 2011. Lake Powell Pipeline Study: Water Needs Assessment. Draft Study 19. Prepared for Utah Division of Water Resources. Table 4-2.
[62] *Ibid.* Table ES-10

rates in the Virgin River Basin are said to be 155,000 AFY, according to the WCWCD.[63] While it is clear the WCWCD does not hold rights to most of the water in Washington County, it still seems likely that future potential yield from groundwater could be higher than what is presented in Draft Study Report 19. More information about groundwater supplies needs to be provided to ensure accurate estimates of current and future yields.

Water Rights

There are questions regarding the analysis of water rights holders in Washington County. The estimated total supplies for Washington County do not appear to include water rights owned by private land owners, yet these populations are presumably accounted for in future population projections. If this is the case, then total current/future water supplies would be under estimated.

In addition, these water rights could theoretically be transferred to water utilities in the future, thereby increasing future potable supply. However, Draft Study Report 19 makes no mention of why private rights might never be converted to public utility water rights by 2060.[64] This issue bears further explanation, and should be included in a complete inventory of water supplies in the County.

Toquerville

The city of Toquerville is a reported to have current secondary supplies of only 160 AFY, 1/3 of system capacity. However, they have rights up to 2,000 AFY, but their future potential supply is only counted as 480 AFY. It may prove impossible for Toquerville to *physically* obtain 2,000 AFY, but there is no justification provided for using the lower estimate when their legal rights are higher. The low estimation seems to have been linked to limitations in their current infrastructure, which is not a sound estimation of future potential water supplies. Moreover, this methodology (i.e. limiting future potential by system capacity, as opposed to water rights or hydrologic capacity) may have been applied to numerous cities, thereby substantially underestimating future potential supplies.

Future Reuse

There is a wide variety of estimates for reuse provided in Draft Study Report 19. One estimate is significantly lower, while three other estimates are higher. The lower estimate is 7,320 AFY instead of 27,620 AFY (Table ES-15 in Draft Study Report 19), and the explanation is that the potential volume of reuse water is limited by demand. This is an unsatisfactory explanation, since the county has five decades to encourage the utilization of reuse water, and this number seems to be based on current demand. Or this may simply be a typo of significant proportions.

The next estimate is located in the footnotes of this same table (Tables ES-15), in which the stated potential is 33,910 AFY. And in Table ES-11 there are statements which say that the

[63] Washington County Water Conservation District. 2010. Water Management and Conservation Plan. pg 31
[64] Utah Division of Water Resources. 2011, Letter of Response to Comments on the Draft Study Reports and Initial Study Report Meeting. pg 237.

maximum potential for the reuse facility would be the treatment of all the effluent from the surrounding St. George communities, which could require a 40 mgd (million gallons per day) reuse facility. A 40 mgd facility would deliver, at a maximum, 44,800 AFY.[65] The variety of estimates for reuse is confusing, and needs to be clarified.

[65] MWH. 2011. Lake Powell Pipeline Study: Water Needs Assessment. Draft Study 19. Prepared for Utah Division of Water Resources. Section 4.1.4.3, and Table ES-11

APPENDIX C: GPCD Analysis

Analysis of Temporary Population's Effect on Washington County's GPCD

Water use in Utah is classified as culinary or secondary, indoor or outdoor, and residential, commercial, industrial, or institutional. Data provided in DWRe's Kanab Creek/Virgin River Basin reports[66] provides details about the water used in each of these categories. This is the most well defined source of water use data for Washington County available (despite being almost a decade old), and is relied upon here to help develop the analysis of per capita water use rates in Washington County that exclude the temporary population.

Washington County has a 27% temporary population[67] that is not accounted for in the typical per capita water use rate calculation, measure in gallons per capita per day (gpcd). When adjusting for this temporary population, by assuming indoor use for 5 months and outdoor use for 12 months, the total system-wide potable use is 208 gpcd and the total residential use is 141 gpcd (see Table C3). Comparing these adjusted numbers with those presented in Figure 4and Figure 5, Washington County's water use rate is still at the high end of the spectrum despite the fact that none of the other cities have included this adjustment, and the data from the other cities is primarily from 2006 and 2008, whereas Washington County data is from 2010. That is to say, these other cities have far surpassed Washington County's achievements in conservation long ago.

Tables C1 shows the original data provided by DWRe in 2005. Table C2 uses the ratios from C1 and applies it to the 2010 gpcd. Table C3 adjusts for the temporary population in 2010 to derive residential and system-wide water use rates.

Table C1. The original 2005 data from DWRe is replicated here, which is the basis for subsequent temporary-population adjusted calculations.

2005 DWRe Data - GPCD				
		Culinary	Secondary	Total
	Res Indoor	71.9	0	71.9
	Res outdoor	97.4	15.8	113.2
	Commercial	61.4	9.5	70.9
	Institutional	15.5	26	41.5
	Industry/stock water	3.7	1	4.7
	Subtotals	249.9	52.3	**302.2**

[66] Utah Department of Natural Resources, Division of Water Resources (DWRe). 2009. Municipal and Industrial Water Supply and Uses in the Kanab Creek/Virgin River Basin (Data Collected for Calendar Year 2005).
[67] MWH 2008.

Table C2. This shows how the reported 2010 per capita rate of water use, 291.6 gallons per capita per day (gpcd), is allocated in proportion to the original 2005 data in Table C1.

2010 GPCD			
	Culinary	Secondary	Total
Res Indoor	69.4	0.0	69.4
Res outdoor	94.0	15.2	109.2
Commercial	59.2	9.2	68.4
Institutional	15.0	25.1	40.0
Industry/stock water	3.6	1.0	4.5
Subtotals	241.1	50.5	**291.6**

Table C3. This shows that the rate of water use changes to 254.3 gpcd when temporary residents are excluded from the calculation.

2010 GPCD POPULATION ADJUSTED - 27% residents removed for 5 months of indoor use and 12 months of outdoor use			
	Culinary	Secondary	Total
Res Indoor	61.6	0.0	61.6
Res outdoor	68.6	11.1	79.7
Commercial	59.2	9.2	68.4
Institutional	15.0	25.1	40.0
Industry/stock water	3.6	1.0	4.5
Subtotals	208.0	46.3	**254.3**

Analysis of Climatic Effects on GPCD

Washington County also justifies their higher water use due to the aridity of the region and the long, hot summers. However, many of the cities listed in Figure 4and Figure 5 have similarly arid climates. Washington County does not have the highest average temperature, or the lowest rainfall, or the highest evapotranspiration rate when compared with Albuquerque, Tucson, or the Las Vegas. But, it does have the highest residential water use, highest outdoor water use, and highest system-wide water use (Table C4.). Washington County's outdoor water use is almost triple that of Albuquerque's and total water use is almost double that of Tucson's.

Table C4. Washington County's outdoor use is the highest even though it does not have the most extreme climate compared with other Southwest Communities.[68]

Entity	Total Res. Use (gpcd)	Outdoor Use (gpcd)	System-wide Use (gpcd)	Avg. Annual Temp (F)	Avg. Annual Precip. (in)	Annual ET (in)
Albuquerque	110	42	173	56.0	8.9	38.1
Las Vegas	174	105	276	68.0	4.5	74.8
Tucson	114	57	156	68.4	12.0	58.0
Washington County	179	109	241	61.8	8.0	55.0

Comparing water use in other Southwest communities to Washington County can provide valuable insight into the potential for water conservation. Tucson, Albuquerque, and Las Vegas have similar average temperatures and rainfall as southwestern Utah, yet there is a significant difference between the rates of water use.

The Alternative does not use the population-adjusted gpcd because 1) Draft Study Report 19 does not, and 2) no other communities do, including Las Vegas which has an extremely high tourist population, and a similar climate. Lastly, the percent of the population that relies on self-supplied water (i.e. personal wells or self-supplied industrial water) is included in population projections and future demand scenarios, even though they are not reliant on any community system water. Presently this population is quite small (0.3%), but it also is not adjusted for in the future population or demand analysis.

[68] Western Resource Advocates. 2006. Water in the Urban Southwest: An Updated Analysis of Water Use in Albuquerque, Las Vegas Valley, and Tucson.

APPENDIX D: Agricultural Land Conversion Calculations

Duty of Water

In Draft Study Report 19 the "duty of water" is defined to be the amount of water (in acre-feet) used per acre of agricultural land. The duty of water in Washington County, as reported in Draft Study Repot 19, was derived from 1990 data, in which the "duty of water' ranged from 3 to 6 AF/ac, so a simple average of 4.5 was used throughout the analysis in Draft Study 19 and this Local Waters Alternative. However, 3 and 6 AF/ac is a very significant range; just a 0.5 AF/ac difference could result in thousands of acre-feet per year more or less than what is expected from land conversions.[69] Thus, this aspect of the analysis needs to be studied much more carefully.

Oftentimes a percentage of agricultural water used is not transferrable, due to evapotranspiration, return flow or legal requirements, or other issues. None of this was mentioned or explicitly accounted for in Draft Study Report 19, although it may be embedded in the 4.5 AF/ac value. Thus, the definition of the "duty of water" requires further explanation by project applicants.

Recalculation of Water from Agricultural Land Conversions

The estimated agricultural conversions in Draft Study Report 19 revealed some inconsistencies. The originally predicted acreage of agricultural conversion was 3,840 between 2005 and 2060.[70] Based on the reported "duty of water"[71] this implies 17,280 AFY of water from agricultural conversions. However since this is based on 2005 levels, presumably a small portion of this has already been converted. The study should have provided estimates starting in 2010, to keep within the time frame that is being planned for.

In contrast with these figures, the total volume of water reported in future water supplies is only 10,080 AFY from agricultural conversions. It is based on conversion of agricultural land from one region called Washington Fields. Using the "duty of water", 10,080 AFY would be correlated with 2,240 acres, in the Washington Fields area. Reportedly 622 acres in Washington Fields were already converted between 2005 and 2010 (derived using the same duty of water ratio), bringing the total up to 2,862 – much lower than the projected 3,840 acres that are expected to be converted.

No explanation is provided as to why water from all 3,840 acres (from 2005) are not accounted for in Draft Study Report 19, and it is not possible to discern how much of that land truly has

[69] MWH. 2011. Lake Powell Pipeline Study: Water Needs Assessment. Draft Study 19. Prepared for Utah Division of Water Resources. Pg 4-42

[70] *Ibid.*

[71] 4.5 acre-feet per acre is the reported volume of water available per acre of agricultural land converted. There are no reductions made as per the methodology employed in Study 19, and thus the methodology is replicated here.

already been converted between 2005 and 2010. These conclusions are derived from the data provided in Table 4-4 in Draft Study Report 19, and it assumes a constant rate of conversion between 2007 (which reported 13,810 acres of extant agricultural land) and 2060 (predicted to have 10,610 acres remaining). This results in 3,020 acres of agricultural land being converted between 2010 and 2060. However, Draft Study Report 19 again provides two conflicting numbers for remaining acreage in 2007: 13,810 acres and 12,740 acres.[72] Thus, there are significant data inaccuracies, which need to be corrected. The conclusion is that the 3,020 acres of agricultural land will provide water at a ratio of 4.5 acre-feet of water per acre, and this results in 13,590 acre-feet of water. This is the same methodology employed in Draft Study Report 19.

Land Development Scenarios and Calculations

Draft Study Report 6 analyzed a variety of land use scenarios for Washington County, based on population projections from 2008. Scenario 3B was elected because (1) Scenario 3 (A and B) was the only scenario which quantified the acreages of land that would be suitable to both urban and agricultural interests, and (2) Scenario 3B does not allow for growth on soil and rock hazard area, which is in keeping with modern land use planning methods.[73]

The scenarios are summarized here:

Scenario 1	*Sprawl* model, allows growth on soil and rock hazard areas
Scenario 2A	Smart growth, allows growth on soil and rock hazard areas
Scenario 2B	Smart growth, allows **no** growth on soil and rock hazard areas
Scenario 3A	Smart growth, allows growth on soil and rock hazard areas, identifies areas of conflict
Scenario 3B	Smart growth, allows **no** growth on soil and rock hazard areas, identifies areas of conflict
Scenario 4A	Smart growth, allows growth on soil and rock hazard areas, identifies areas of land use preference
Scenario 4B	Smart growth, allows **no** growth on soil and rock hazard areas, identifies areas of land use preference

Population and density data for scenario 3B was derived Table 4-11 in Draft Study Report 6. Since this Draft Study Report was developed under much higher population projections, the data– such as the appropriate population density and acres of land needed - was scaled in proportion to the new population projections. The calculations resulted in an average density of 2.53 housing units per acre, with 2.55 persons per household across the county, including existing and future development. This results in 6.47 people per acre, and based on GOPB population projection this implies a total developed area (new and existing) of roughly 89,900

[72] MWH. 2011. Lake Powell Pipeline Study: Water Needs Assessment. Draft Study 19. Prepared for Utah Division of Water Resources. Pg 4-42

[73] Utah Board of Water Resources. 2011. Draft Study Report 6: Land Use Plans and Conflicts. Pg 3-20

acres. Existing development is about 32,400 acres[74], so this means 57,500 acres are needed to be developed. According to Scenario 3B, 45,500 acres can be developed without conflict, which leaves about 12,000 acres coming from areas that are also suitable for agriculture or conservation.

[74] Utah Board of Water Resources. 2011. Draft Study Report 6: Land Use Plans and Conflicts. Figure 3-6

APPENDIX E: Temporary Agricultural Water Transfers

Farmers and water providers that do not want to permanently transfer agricultural water to municipal users have several alternative options, including rotational fallowing agreements, water leases, water banks tied to agricultural efficiency and alternate cropping practices.

In rotational fallowing agreements, an individual or group of farmers agree to fallow a portion of their land and then sell the unused portion of their water supply to municipalities. This process repeats year after year, with different land fallowed in each year. These types of agreements have worked well in California and are being investigated in several states and provide various benefits:

- Irrigators who are susceptible to fluctuating crop prices receive some financial stability;
- Irrigators rest cropland, benefitting soils and improving crop yields, while allowing for irrigation infrastructure improvements and critical maintenance operations that improve system efficiency; and
- Municipalities receive a steady supply of water, while establishing long-term economic ties that can support rural communities and the region.

Pursuing rotational fallowing agreements has the potential to ease some of the resistance from the agricultural community that can result under "buy and dry" (permanent) transfers. However, rotational agreements provide a more limited new water supply. For example, a three-year fallowing rotation involving all Washington County agricultural land would yield only one third of the water used in remaining agricultural land. In reality, not all farmers would likely participate, further shrinking the available water volumes.

Leasing water is one option for cooperation between agricultural water users and municipalities. Water can be leased out for long periods of time, for example a decade or more, or for shorter periods of time, such as one year when dry/drought conditions prevail. Dry year leases can be structured in various ways. For example, a farmer may agree to lease water to a city during a drought in exchange for regular annual payments from the city, even in normal water years. In a time of drought, the farmer fallows irrigated land and transfers the conserved water to the city, in exchange for a forbearance payment. These types of agreements provide certainty to cities during drought, but they do not provide new water supplies that meet long-term growing demands.

Agricultural water efficiency improvements could provide additional water supplies. Alternate cropping practices can free up water by switching a high water-using crop to a low-water using crop. Municipalities would pay for the efficiency improvements in agriculture, and then use the quantity of water saved for their own purposes.

There are also some challenges associated with agricultural water transfers. For example, some agricultural water supplies in Washington County have high levels of total dissolved solids (TDS). TDS levels greater than 500 mg/L may be unsuitable for culinary water treatment and levels greater than 1000 mg/L may be unsuitable for secondary uses. In addition, to maximize agricultural transfers, infrastructure needs will also have to be addressed. Exchanging water upstream on the Virgin River to be captured and recharged in an expanded Sand Hollow Aquifer Storage and Recovery (ASR) project may be an alternative to constructing additional pipelines, under an expanded agricultural-urban transfer program. Lastly, there are legal challenges to forging these agreements that can be a significant barrier. The State of Utah may be able to play an important role in facilitating these agreements.

APPENDIX F: Economic Analysis

Conservation

The Washington County Water Conservancy District published the *Washington County Water Management and Conservation Plan*, updated in 2010. This document quantifies current and future water supplies and demands. In Appendix A of this study, they included portions of a document developed by a consultant, Maddaus Water Management, who evaluated conservation program options and costs. A primary objective of this analysis was to examine how the County can achieve the State mandate to reduce per capita water use by 25% by 2050.

The consultants developed 3 conservation program scenarios, which had either 14, 25 or 37 conservation measures included. Each program was modeled to run for 30 years, and the associated water savings and costs were estimated based on penetration rates of the programs. An estimate of the cost to the utility and the "community costs" – which reflects costs to customers as well as the utility – were included.

The capital costs to the utility were reported in present value (2007) dollars. The utility's cost per acre-foot (which ranges from $92 - $122) represents the capital costs divided by the total volume of water saved *cumulatively* over a 30 year period. The 30 year Community Cost is similarly calculated. These results from the Maddaus study are reproduced in the table below. These are the primary figures from which the cost of conservation was derived for this Alternative.

Table G1. This table shows the costs of the three conservation programs modeled by Maddaus, in 2007$.

	# Conservation Measures	30 Year Present Value of Water Utility Costs	30 Year Utility Cost of Water Saved ($/AF)	30 Year Community Cost of Water Saved ($/AF)
Program A	14	$17,968,000	$ 92	$ 261
Program B	25	$29,238,000	$ 98	$ 328
Program C	37	$41,153,000	$ 122	$ 446

The total, cumulative water saved under Program C (337,320 AF) was calculated based on the 30 Year Present Value of Water Utility Costs and cost per acre foot. This was divided by 30 years to obtain the average water saved in a year (11,244 AF). The present value utility costs was then divided by that average (11,244 AF). This results in an estimated capital cost per an acre-foot saved. This was converted into a 2010 present value, based on the US Bureau of Economic

Analysis data[75], and obtained $3,824/AF. The same calculation method was used to estimate community costs (based on the same cumulative water savings) and obtained the result of $13,980/AF.

The reason for obtaining the capital cost per acre-foot saved is so that this cost could be applied to each acre-foot that would be saved over time (out to 2060) in the Local Waters Alternative for Washington County. Those future costs were then discounted back to 2010, so that it would be comparable to the cost analysis developed for the Lake Powell Pipeline. This estimate reflects the most expensive scenario modeled by Maddaus, even though some conservation measures - like the recommended rate structure changes - are cheaper

Reuse

The capital costs of various water reuse facilities are presented here, which was useful to provide context for the estimated reuse facility cost. The St. George Regional Water Reclamation Facility cost $4.2 million to construct in 2006. This facility was an addition to an existing wastewater treatment facility, therefore the costs are quite low compared with some other reuse facilities that have been built recently in the West. The costs for new reuse facilities vary widely, due to a variety of factors such as volume of water treated and likely water treatment technology.

Table G2. This table shows the range of capital costs for building a reuse or reverse osmosis treatment plant.

Source	Capital Cost, year	Facility capacity in million gallons per day (mgd)	Capital cost/unit water	Citation
St. George Regional Water Reclamation Facility	$4,200,000 in 2006	7 mgd	$600,000/mgd	City of St. George and Bowen Collins and Associates[76]
North Las Vegas Reuse facility	$240,000,000	25 mgd	$9,600,000/mgd	Las Vegas Review Journal[77]
Las Vegas	$37,000,000	10 mgd	$3,700,000/mgd	City of Las

[75] United States Department of Commerce, Bureau of Economic Analysis. Table 1.1.9. Implicit Price Deflators for Gross Domestic Product. www.bea.gov accessed on November 5, 2012

[76] Chandler. M., Ford, B. Water Reuse – a multifaceted resource. Presentation by Bowen Collins and Associates, and the City of St. George. https://pncwa.memberclicks.net/assets/2010ConfTechPresentations/Session09/2010%20pncwa-%20session%209-2%20-%20reuse%20-%20mike%20chandler.pdf Accessed November 7, 2012.

[77] Curtis, L. North Las Vegas Flow has no place to go. Las Vegas Review Journal. March 22, 2010. http://www.lvrj.com/news/north-las-vegas-flow-has-no-place-to-go-88803272.html Accessed November 7, 2012.

Durango Hills Water Resource Center				Vegas[78]
Reverse Osmosis – Low Estimate	$176, 900,000 in 2010$	36 mgd	$4,900,000/mgd	Draft Study Report 10
Reverse Osmosis – High Estimate	$341,200,000 in 2010$	36 mgd	$9,500,000/mgd	Draft Study Report 10
Colorado Water Conservation Board			$7,000/AF	CWCB. Reconnaissance Level Cost Estimates.[79]
Colorado Water Conservation Board			$13,500/AF	CWCB. Reconnaissance Level Cost Estimates.[80]

[78] City of Las Vegas Department of Public Works. Durango Hill Water Resource Center – A water recycling facility and distribution system. http://www.lasvegasnevada.gov/files/NWwaterresourcecenter.pdf Accessed November 7, 2012.

[79] CDM. 2010. *Appendix N - Reconnaissance Level Cost Estimates for Agricultural and New Supply Strategy Concepts.* Prepared for Colorado Water Conservation Board. June 4. http://cwcb.state.co.us/water-management/water-supply-planning/Documents/SWSI2010/Appendix%20N_Reconnaissance%20Level%20Cost%20Estimates%20for%20Strategy%20Concepts.pdf

[80] CDM. 2010. *Appendix N - Reconnaissance Level Cost Estimates for Agricultural and New Supply Strategy Concepts.* Prepared for Colorado Water Conservation Board. June 4. http://cwcb.state.co.us/water-management/water-supply-planning/Documents/SWSI2010/Appendix%20N_Reconnaissance%20Level%20Cost%20Estimates%20for%20Strategy%20Concepts.pdf

WESTERN RESOURCE ADVOCATES

PROTECTING THE WEST'S LAND, AIR, AND WATER

Attachment C

January 17, 2019

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Re: Public Notice SPK-2008-00354; Lake Powell Pipeline Project

Dear Mr. Wilson and Ms. Gardberg,

Western Resource Advocates thanks you for the opportunity to submit comments on Public Notice SPK-2008-00354, the Lake Powell Pipeline Project. The proposed project would impact approximately 10.54 acres or 51,636 linear feet of waters of the United States, including wetlands, in or adjacent to Lake Powell and the Virgin River.[1]

INTRODUCTION

Western Resource Advocates is a nonprofit conservation organization dedicated to protecting the Interior West's land, air, and water. We promote river restoration and water conservation, advocate for a clean and sustainable energy future, and protect public lands for present and future generations. Western Resource Advocates engages with utilities, state and federal government agencies, and irrigators to find solutions to meet growing urban water demands while protecting stream flows for fish, wildlife, and recreation. Western Resource Advocates is a long-time member of the Upper Colorado River Endangered Fish Recovery Program—a large, multi-stakeholder effort to recover four endangered fish species in the Upper Colorado River Basin. Western Resource Advocates'

[1] See, SPK-2008-00354 Public Notice, available at: https://www.spk.usace.army.mil/Media/Regulatory-Public-Notices/Article/1716369/spk-2008-00354-lake-powell-pipeline-project/ accessed on January 4, 2019.

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members and employees are located throughout the arid and semi-arid states of the Interior West.

WRA represents a diverse group of stakeholders in both Utah and Arizona. WRA and its members have a special interest in protecting, restoring, and enjoying the Colorado River and its tributaries. WRA's team of scientists, lawyers, and economists craft and implement innovative solutions to the most complex natural resource challenges in the region. WRA's work in Utah and Arizona includes finding solutions to those states water needs that do not include large-scale development projects such as the Lake Powell Pipeline. WRA has experience in helping western communities meet their water needs, as well as extensive knowledge of the water delivery systems in the Colorado River Basin.

In 2013, WRA produced a report offering alternatives to Lake Powell Pipeline that would meet southern Utah communities' foreseeable water needs without requiring construction of the Pipeline.[2] WRA continues to seek alternatives to potentially unnecessary and environmentally damaging water development projects in the West, including the Lake Powell Pipeline. WRA's expertise in helping communities meet their municipal water needs through water conservation, reuse, and water sharing with agriculture, as well as our prior application of this knowledge and advocacy to the proposed Lake Powell Pipeline, gives WRA a vested interest and valuable expertise in water use in southern Utah and Arizona.

PROJECT BACKGROUND

The Utah Board of Water Resources ("UBWR") submitted an application for a license under the Federal Power Act for the Lake Powell Pipeline Project ("Pipeline"), Federal Energy Regulatory Commission Project No. 12966, on April 30, 2016. The proposed Pipeline would be located in Washington and Kane Counties, Utah, and in Coconino and Mohave Counties, Arizona. Although the Pipeline, if approved, would be licensed to and constructed and operated by UBWR, the water delivered by the Pipeline would be used by the Washington County Water Conservancy District ("WCWCD") and the Kane County Water Conservancy District ("KCWCD") (collectively, the "Water Districts") for municipal and industrial water supply. Under the State of Utah's Lake Powell Pipeline Development Act, the State of Utah is the direct sponsor of the Pipeline. However, the Water Districts are the ultimate beneficiaries of the Pipeline and would be required to reimburse the State for the costs of developing the Pipeline.

[2] Exhibit 1, attached hereto: Amelia Nuding, Western Resource Advocates, Local Waters Alternative to the Lake Powell Pipeline (Mar. 13, 2013), also available at the Federal Energy Regulatory Commission eLibrary 20130314-5010.

The 140-mile proposed Pipeline would deliver water from Lake Powell, a federal reservoir in Arizona operated by the Bureau of Reclamation, to Sand Hollow Reservoir, near St. George, Utah for eventual distribution to the Water Districts' municipal and industrial water customers. To help cover the costs of conveying this water, the Pipeline proposes to include a series of hydroelectric turbines placed along the 89-mile downhill side of the Pipeline.[3] To this end, the Pipeline also proposes to include a pumped storage development in Washington County, Utah. Much of the proposed Pipeline would be located on public lands managed by the Bureau of Land Management.[4] UBWR plans to sell electricity generated by the Pipeline to regional transmission operators as an incidental purpose of the Pipeline.[5]

PROCEDURAL HISTORY BEFORE THE FEDERAL ENERGY REGULATORY COMMISSION

On December 11, 2017 the Federal Energy Regulatory Commission issued its Notice of Application Accepted for Filing, Soliciting Motion to Intervene and Protests, Ready for Environmental Analysis, and Soliciting Comments, Recommendations, Terms and Conditions, and Prescriptions ("NREA").[6] On December 27, 2017, UBWR petitioned the Commission urging the Commission to declare that the water delivery pipelines are part of the hydropower project and subject the Commission's jurisdiction under the Federal Power Act.[7] It concurrently moved for "the Commission to suspend the licensing proceeding immediately, and act expeditiously[.]"[8] On January 9, 2018 WRA filed an Answer opposing UBWR's motion for expedited action, and supporting UBWR's motion for suspension of the procedural schedule.[9]

On January 10, 2018 the Commission issued its Notice of Petition for Declaratory Order, and therein provided all interested parties to make comments and motions or

[3] Application for Original License, Integrated Licensing Proposal (Public Filing) The Lake Powell Pipeline Project, FERC Project No. P-12966 at A-1 to -2 (April 30, 2016), FERC eLibrary 20160502-5386.
[4] *Id.*, Draft Plan of Development – Pipeline and Hydro Facilities at 1-4 (describing proposed facilities that would be on land administered by the Bureau of Land Management).
[5] *See* Application at ES-7.
[6] FERC eLibrary 20171211-3022.
[7] UBWR, "Petition for Declaratory Order on Jurisdiction, Motion for Expedited Action, and Motion for Suspension of Procedural Schedule," eLibrary no. 20171227-5166 (Dec. 27, 2017), p. 1 (Petition).
[8] *Id.* at 2.
[9] FERC eLibrary 20180109-5125.

petitions to intervene on or before February 12, 2018. On January 11, 2018 the Commission issued its Notice Suspending Procedural Schedule on the license application until after the Commission issues its decision on UWBR's Petition for Declaratory Order.

On September 20, 2018 the Commission issued an Order Denying Petition on Declaratory Order for Jurisdiction.[10] In that Order, the Commission held that it would license only the hydroelectric generation facilities ("i.e., the generating facilities, primary transmission lines, and any necessary appurtenant structures, such as dams"[11]) contemplated as part of the proposed Lake Powell Pipeline project, but not the water conveyance system. The Commission also held that it "will not act as the ultimate decision maker for approving any portion of the overall project beyond the discrete hydropower facilities. In addition, the Commission will not be responsible for determining which alternative route for the water delivery pipeline should be chosen."[12]

ARGUMENT

I. THE CLEAN WATER ACT PREVENTS ANY 404 PERMIT FROM BEING ISSUED FOR THE PROPOSED LAKE POWELL PIPELINE

The Clean Water Act imposes a substantive limit to the Corps' discretion here, even as a cooperating agency, such that it may only select the least environmentally damaging practicable alternative to the proposed project. Under Guidelines implementing Section 404(b)(1) of the Clean Water Act:

> the Corps may not issue a [dredge or fill] permit if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, unless the alternative has other significant adverse environmental consequences. A practicable alternative is one that is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.[13]

The purpose for severely constraining the Corps' discretion when considering dredge and fill applications is straightforward:

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[10] Federal Energy Regulatory commission "Order Denying Petition for Declaratory Order on Jurisdiction", FERC eLibrary No. 20180920-3043 (September 20, 2018).
[11] *Id.* at ¶ 68.
[12] *Id.* at ¶ 70.
[13] *Greater Yellowstone Coal. v. Flowers*, 359 F.3d 1257, 1269 (10th Cir. 2004) (internal quotations omitted; quoting 40 C.F.R. § 230.10(a)).

> dredged or fill material should not be discharged into the aquatic ecosystem, unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact either individually or in combination with known and/or probable impacts of other activities affecting the ecosystems of concern. . . . From a national perspective, the degradation or destruction of special aquatic sites, such as filling operations in wetlands, is considered to be among the most severe environmental impacts covered by these Guidelines. The guiding principle should be that degradation or destruction of special sites may represent an irreversible loss of valuable aquatic resources.[14]

The Corps' burden under the Clean Water Act is especially steep where, as here, the preferred alternative does not appear to be "water dependent."[15] In cases like the proposed Lake Powell Pipeline:

> [T]he presumption is that there are practicable alternatives that do not involve special aquatic sites and that these alternatives do have less adverse impact on the aquatic ecosystem. These presumptions hold unless clearly demonstrated otherwise. [The Tenth Circuit has] thus held that in such a case, the Corps may not issue a § 404 permit unless the applicant, with independent verification by the Corps, provides detailed, clear and convincing information ***proving*** that an alternative with less adverse impact is impracticable.[16]

If the information in the record is insufficient to determine the existence of practicable alternatives, the dredge and fill permit must be denied.[17] As will be further explained in the next section of these comments, WRA has already offered a practicable suite of alternatives that would prevent the U.S. Army Corps of Engineers from issuing a § 404 permit for the proposed Lake Powell Pipeline.

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[14] 40 C.F.R. § 230.1 (c), (d).
[15] *Id.* at 230.10(a)(3).
[16] *Greater Yellowstone Coal.*, 359 F.3d at 1269 (emphasis in original; internal quotations omitted; quoting 40 C.F.R. § 230.10(a)(3) and *Utahns for Better Transp.*, 305 F.3d at 1186-87).
[17] *Greater Yellowstone Coal.*, 359 P.3d at 1269.

II. THE U.S. ARMY CORPS OF ENGINEERS SHOULD NOT ISSUE ANY PERMIT FOR THE PROPOSED LAKE POWELL PIPELINE BECAUSE THE PROJECT DOES NOT MEET THE CORPS' PUBLIC INTEREST REVIEW PERMITTING CRITERIA UNDER 33 C.F.R. § 320.4.

The U.S. Army Corps of Engineers is required to evaluate each and every permit application under a variety of factors.[18] Those factors include an extensive public interest review.[19] That public interest review includes consideration of the "extent of the public and private need for the proposed structure or work" and "[w]here there are unresolved conflicts as to resource use, the practicability of using reasonable alternative locations and methods to accomplish the objective of the proposed structure or work".[20] The proposed Lake Powell Pipeline fails the public need for the structure, as WRA's Local Waters Alternative establishes there are less costly and less burdensome ways to supply these communities with sufficient water. The Local Waters Alternatives also establishes that there is an outstanding conflict as to the resource use (in this case water from Lake Powell), whether such is use is necessary and that there exist alternative water supplies that would avoid damaging the waters of the United States, because building the proposed Lake Powell Pipeline is not necessary.

UBWR fails to present a reasonable or realistic No Action Alternative or No Lake Powell Water Alternative for meeting Washington County Water Conservancy District's (WCWCD) and the other relevant entities' future water needs. Specifically, the Board offers only three limited alternative options:

- **Advanced Treatment of Existing Supplies**: Treatment of Virgin River water supplies and wastewater reuse effluent by reverse osmosis (RO).
- **Water Conservation**: Eliminating residential outdoor irrigation with potable water.
- **Development of Local Supplies**: Conveying available groundwater from Kane County to Washington County by pipeline.

The Alternatives listed by UBWR are insufficient as described, and fail to recognize other viable options. In addition, the Board assumes unnecessarily large future water demands, which are based on weak conservation programs and poor data collection practices.[21] UBWR's proposed alternatives are not reasonable or supported by administrative record, and fail to consider where the proposed project is actually needed by the public pursuant

[18] 33 C.F.R. § 320.4.
[19] 33 C.F.R. § 320.4(a).
[20] 33 C.F.R. § 320.4(a)(2)(i)-(ii).
[21] *See infra*.

to 33 C.F.R. § 320.4(a)(2)(i).

i. Western Resource Advocates' update to the *Local Waters Alternative*

Western Resource Advocates presents the following Alternative, which is reasonable, cost-effective and represents the Least Environmentally Damaging Practicable Alternative. Specifically we propose the following Alternative Actions that will supplant the need for the Lake Powell Pipeline:

- **Advanced Treatment of Existing Supplies**: Treatment of Virgin River water supplies and wastewater reuse effluent by reverse osmosis (RO).
- **Water Conservation**: Water rates that encourage efficiency, land use policies to substantially increase water efficiency in new construction.
- **Development of Local Supplies**: Conveying available groundwater from Kane County to Washington County by pipeline. Transferring a more realistic volume of water from agricultural uses to municipal uses.
- **Water Data Management:** Universal metering of all culinary and secondary water deliveries, and improved tracking to inform water management and conservation efforts.

Western Resource Advocates presents here a realistic No Action Alternative based upon our *Local Waters Alternative to the Lake Powell Pipeline*[22] that corrects the flaws of the Project Applicant's alternatives proposal. In addition, our Alternative would incur less environmental harm than the applicant's proposed LPP action. Our alternative shows how Washington County can pursue water conservation, water reuse, and conversion of agricultural water to Municipal and Industrial (M&I) uses to meet future water needs and avoid construction of a costly and environmentally damaging water supply pipeline.

In 2013 Western Resource Advocates submitted the *Local Waters Alternative* to FERC as a reasonable and realistic No Action Alternative to the LPP. Although the project applicants have since updated some of their data related to population growth, water supply, and water demand, the central conclusions of the *Local Waters Alternative* remain unchanged:

- The *Local Waters Alternative* (or a similar set of approaches) more than meets future

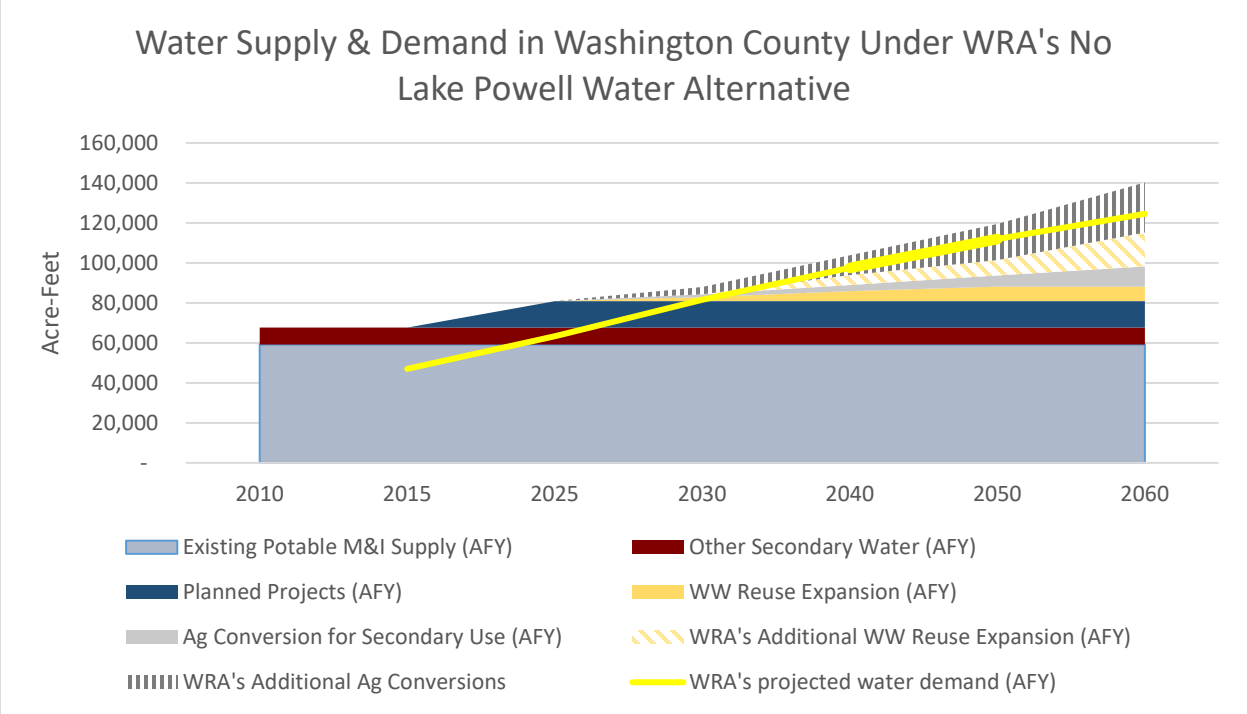
[22] Exhibit "1", *supra*.

water needs in Washington County;

- Implementation of reasonable and cost-effective conservation measures would substantially lower future water demand projections;
- Reuse and agricultural water transfers can provide significant amounts of new water supply to meet projected water needs;
- The *Local Waters Alternative* costs significantly less than the proposed LPP.

Figure 1 is a graphical summary of Western Resource Advocates' No Action Alternative, as described in the *Local Waters Alternative.* Figure 1 has been updated with the latest data on population projections, water supplies and water demand, illustrating that WRA's proposed solutions remain viable today.

<u>Figure 1</u>. A graphical summary of WRA's Alternative to the Lake Powell Pipeline



Our analyses uses much of the same data provided by the project applicants, but also has some important differences, as explained here:

- WRA's population projection match those used in the Final Study Reports 22 and 19.
- WRA uses most of same water supplies as reported by WCWCD in Final Study

Report 22 Alternatives Development (Table 3-1): Existing potable M&I Supply, Planned Projects, Wastewater Reuse Expansion, Other Secondary Water, and Agricultural Conversion for secondary use.

- WRA does not include any water from the LPP, nor does it include UBWR's water from "Additional Wastewater Reuse Expansion Beyond Existing Capacity." Instead, WRA uses our own projected volume of reuse water, which is lower due to decreased supply from residents due to conservation.
- WRA adds in additional water resources from expanded agricultural water conversions, as would be expected from the significant population growth that would occur on agricultural lands, permanently changing the use of those lands.
- WRA uses the more recent and accurate 2015 water demand from the Division of Water Resources[23] as the baseline for water demand, instead of the less accurate 2010 baseline provided by UBWR. We apply a 1% per capita conservation rate per year, which is explained further in section IIc.

ii. **WRA's Alternatives to the LPP are Less Expensive than the Proposed Project.**

The Local Waters Alternative proposes cost-effective strategies to meet WCWCD's reasonable future water needs, including:

- Improved tiered-rate structures that reflect the true cost of water rather than the currently low-water rates that are combined with property tax revenue for the district;
- New construction codes that ensure water-efficient new development is built using standard techniques like: soil amendment, efficient irrigation systems and native, low-water using plants;
- Full metering of all culinary and secondary water to more precisely track water usage and trends, and subsequently focus water efficiency program efforts where they will achieve the most significant savings for the dollars invested.

In contrast, UBWR's Application presents a false choice between building an expensive water supply pipeline to support unreasonably high per capita water use rates, and the permanent elimination of outdoor watering with potable water supplies. This is not only a

[23] Utah Division of Water Resources, Utah's Open Water Data, https://dwre-utahdnr.opendata.arcgis.com/datasets/mnireport2015-counties (last visited September 5, 2018).

virtually unheard of conservation technique for long term water management, it ignores the less expensive and more commonly utilized conservation options described above.

The Local Waters Alternative concludes that the LPP would cost substantially more than the Alternatives. Figure 2, below, depicts the original conclusions of the Local Waters Alternative, which have not been updated since its release in 2013, but are still representative of the relative costs.

Figure 2. The cost of the Local Waters Alternative is about 1/3 the cost of the Lake Powell Pipeline, with some infrastructure costs undetermined. All costs assume a 4.14% discount rate.

	Local Waters Alternatives	**Lake Powell Pipeline**
Conservation Costs	$236.1 million	
Reuse	$130.1 million	
Agriculture	$34.4 million + infrastructure costs	
TOTAL COSTS	**$410.3 million + infrastructure costs**	**$1,261.3 million**

UBWR's Application does not provide a direct cost comparison between the proposed Lake Powell Pipeline and all reasonable project alternatives, including the No Action Alternative. However, the Local Waters Alternative is viable, less environmentally damaging, and less expensive than the proposed Lake Powell Pipeline project. This plan realistically represents what the project beneficiaries would actually do in the event of the denial of a necessary permit. WRA's Local Waters Alternative establishes that the proposed project does not meet the public need requirement under 33 C.F.R. § 320.4(a)(2)(i).

a. Project Applicant Greatly Exaggerates Water Demands and Do Not Provide Adequate Substantiation.

On November 16th, UBWR submitted a public filing entitled "Water Needs Assessment: Demand and Supply Update" providing new water use rates (in gallons per capita per day) compared with Final Study 19[24]. These new water use rates, and the impact they will have, are insufficiently explained, in spite of the fact that it represents a 16% decrease in per capita water use. This is a substantial enough change to warrant a revision

[24] Attached hereto as Exhibit "2".

of the entire Water Needs Assessment. In addition, UBWR introduces a "15 year planning reserve" in claiming their need for the LPP. This term is not well defined by the applicant, and it is unclear what the purpose and associated quantities of water are. Therefore, UBWR provides insufficient data to support their claimed need for this project.

Recall that the U.S. Army Corps of Engineers is required, under 33 C.F.R. § 320.4(a), to do a thorough analysis of any proposed project, including 1) whether there is public or private need for the work and 2) whether there are other reasonable methods to accomplish the needs or goals of the proposed work without impacting waters of the United States. In the present application, the project applicant cannot prove that the project is needed for either public or private use, because the Project Applicant does not have reliable data to establish that the project is necessary, or what need it would fulfill. Additionally, the data and conclusions contained in the Local Waters Alternative and the fact that the project applicant does not have adequately-supported data both indicate that to the extent there is a need for additional water resources in these communities, there are ways to fulfill that asserted need without building the Lake Powell Pipeline, and which would not implicate waters of the United States. For these two reasons WRA urges the U.S. Army Corps of Engineers to deny the requested permit.

WRA provides a critique of the Final Study 19 Water Needs Assessment, as this is the proper document to reference and analyze, despite the new data released only days before the last public comment period closed. WRA will address the additional submission later in these comments.

In the Final Study 19, UBWR reports that WCWCD's system-wide per-capita water demands were 325 gallons per person per day (gpcd) in 2010, and they will be 311 gpcd by 2020.[25] These figures have changed substantially since the draft reports. Moreover, recent data from the Division of Water Resources reports that per capita water demands in 2015 in Washington County were only 303 gpcd, lower than the water use figures used by the Project Applicants.[26]

The Division of Water Resources notes that these data cannot be directly compared with data from previous years, due to numerous differences and improvements in data collection and reporting methodologies. The improved data collection methodologies were largely a result of the findings of Legislative Auditor General's 2015 report, which

[25] Final Study 19, Table 3-3, pg. 3-5, FERC eLibrary 20160502-5386.
[26] Utah Division of Water Resources, Utah's Open Water Data, https://dwre-utahdnr.opendata.arcgis.com/datasets/mnireport2015-counties (last visited September 5, 2018).

concluded that "[t]he Division does not have reliable local water use data."[27] Therefore, the U.S. Army Corps of Engineers should use the more recent data from 2015 as their baseline per capita water demands, and adjust future projections accordingly. This adjustment would result in lower – and more accurate – projected future water demands.

UBWR's future water needs projections are also unrealistically high, and severely underestimate the role that water conservation can play in reducing demand for water. Figure 3 below compares UBWR's projected water demands with WRA's projections. UBWR assumes that per capita water usage does not change between 2030 and 2050, yet fails to supply any justification for keeping water use rates static for two decades.

Figure 3. A comparison of anticipated per capita water use by WCWCD and Western Resource Advocates (data from Final Study 19, Table 3-3, page 3-5).

Year	WCWCD Per Capita Use with Conservation(gpcd)	Western Resource Advocates' Per Capita Use with Conservation
2010	325	
2015		303
2020	311	288
2030	295	260
2040	295	235
2050	295	213
2060	285	192

It is inaccurate and inappropriate to assume that future water demands will not decline over a period of 20 or more years. Water demands will undoubtedly decline every year due to simple replacement of old, higher water-using fixtures (e.g. toilets, showerheads, faucets) with new, more-efficient models. Notably, the USGS has documented a national trend of declining per capita water use in the municipal sector since

[27] OFFICE OF THE LEGISLATIVE AUDITOR GENERAL, STAT OF UTAH, A PERFORMANCE AUDIT OF PROJECTIONS OF UTAH'S WATER NEEDS. REPORT OF THE UTAH LEGISLATURE NO. 2015-01 (MAY 2015). pg ii.

2005.[28] And regionally, a 2011 Pacific Institute report documented 100 cities and water agencies in the Colorado River Basin, finding that "the majority of people receiving water from the Colorado River basin live in areas where per capita deliveries dropped an average of at least one percent per year from 1990 to 2008."[29] Some of the water agencies that achieved per capita declines of 1% or more per year are located in Utah, namely Salt Lake City, Provo, West Jordan, Orem, Springville and Pleasant Grove, indicating that this trend is not unique to other states.[30] Therefore, the minimal reductions in per capita water use proposed by UBWR are unrealistic and unreasonable.

UBWR's analysis of future water demands is unsupported and is greatly inconsistent with well-documented regional trends toward reduced per capita water requirements over time. As a result of UBWR's incorrect baseline water use data, and unreasonable assumptions regarding water conservation and efficiency, future water demand projections are grossly inflated and unrealistic. This means the proposed project currently fails the required "public […] need for the proposed structure or work" and therefore the permit must be denied.[31]

III. THE U.S. ARMY CORPS OF ENGINEERS SHOULD NOT ISSUE ANY PERMITS UNTIL THE QUESTION OF WHICH FEDERAL REGULATORY AGENCY WILL MAKE THE FINAL DECISION AS TO THE ROUTE FOR THE NON-HYDROELECTRIC PORTIONS OF THE PROPOSED LAKE POWELL PIPELINE

Recall, as previously cited above, the U.S. Army Corps of Engineers own public interest review requires consideration of whether there are "unresolved conflicts as to resource use".[32]The Federal Energy Regulatory Commission has a limited approval or disapproval authority over the LPP. As FERC recently stated in its own Jurisdictional Order, as explained above, the Commission has jurisdiction over the discrete hydropower components of the Lake Powell Pipeline, <u>but not the Pipeline itself</u>.[33] The Commission

[28] United State Geological Survey. 2018. Summary of Estimated Water Use in the United State in 2015. https://pubs.usgs.gov/fs/2018/3035/fs20183035.pdf. Attached hereto as Exhibit "3".
[29] Cohen, M. J. 2011. Municipal Deliveries of Colorado River Basin Water. Pacific Institute. pg. iii. http://www.pacinst.org/reports/co_river_municipal_deliveries/. Executive Summary is attached hereto as Exhibit "4".
[30] *Id*. at 31.
[31] 33 C.F.R. § 320.4(a)(2)(i).
[32] 33 C.F.R. § 320.4(a)(2)(ii)
[33] FERC Jurisdictional Order at ¶ 67.

noted that it "will not act as the ultimate decision maker for approving any portion of the overall project beyond the discrete hydropower facilities. In addition, the Commission will not be responsible for determining which alternative route for the water delivery pipeline should be chosen."[34]

Most of the concern and controversy surrounding the LPP relates to the pipeline's potential location, the applicants' water supply and demand analyses, the potential impacts to the Colorado River, and other issues related to water supply management. The project applicants concede that the LPP will be built primarily as a water supply pipeline and that the hydropower components' purpose is to "help offset" the pipeline's energy demands.[35] It follows that selection of a non-pipeline alternative would likely obviate the applicants' claimed need for the hydropower facilities considered in the PLP. Therefore, the incidental hydropower components are not the primary consideration for the agencies choosing between the LPP and alternatives. This creates uncertainty as to the route of the proposed pipeline, the location of facilities, and therefore what waters of the United States and which particular locations of each water might suffer impacts as a result of the proposed project. The Army Corps of Engineers cannot possibly perform a substantive analysis of the potential impacts and damage to the aquatic environment at this stage. Accordingly this application should be put on hold until the various federal agencies' jurisdictions are properly determined and actual potential locations and routes for the project have been identified and established.

CONCLUSION

Thank you for the opportunity to comment on Pubic Notice SPK-2008-00354, the Lake Powell Pipeline Project. For the reasons stated above, we request that the U.S. Army Corps of Engineers deny the permit application. We appreciate your time and attention to this matter.

Very Truly Yours,
/s/ Ariel C. Calmes
Ariel C. Calmes
Staff Attorney – Healthy Rivers Program
Western Resource Advocates

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[34] *Id.* at ¶ 70.

[35] *See, e.g.*, UBWR's Response to Additional Information Request Sch. B, Item 1 (Oct. 24, 2016), FERC eLibrary No. 20161024-5067 ("The peaking and pumped storage facilities are intended to generate revenue to help offset the cost of constructing and operating the water supply pipeline").

Attachment D

Arizona Revised Statutes Annotated
Title 45. Waters
Chapter 1. Administration and General Provisions (Refs & Annos)
Article 11. Exportation of Water from this State (Refs & Annos)

A.R.S. § 45-292

§ 45-292. Approval required to transport water out of state; application; fee; criteria; hearing

Effective: July 29, 2010
Currentness

A. A person may withdraw, or divert, and transport water from this state for a reasonable and beneficial use in another state if approved by the director pursuant to this article. A person shall not transport water from this state unless approved by the director, but this article does not apply to or prohibit transporting water from this state as required by interstate compact, federal law or international treaty.

B. An application to transport water from this state for use in another state shall be filed with the director, including a fee established by the director by rule. In establishing a fee by rule, the director may consider factors including the amount of time likely to be expended in processing the application, the amount of preexisting hydrological information available, if any, and the complexity of the application. The application shall include:

1. The name and address of the applicant's statutory agent in this state for service of process and other legal notices.

2. The legal basis for acquiring the water to be transported.

3. The purpose for which the water will be used.

4. The annual amount of water in acre-feet for which the application is made.

5. The proposed duration of the permit, not to exceed fifty years with an option to renew.

6. Studies satisfactory to the director of the probable hydrologic impact on the area from which the water is proposed to be transported.

7. Any other information which the director may require.

C. The director shall approve or reject the application. If the director approves the application, the director may prescribe terms and conditions for the approval. In determining whether to approve the application the director shall consider:

1. Whether the proposed action would be consistent with conservation of water, including any applicable management goals and plans.

2. Potential harm to the public welfare of the citizens of this state.

3. The supply of water to this state and current and future water demands in this state in general and the proposed source area in particular.

4. The feasibility of intrastate transportation of the water that is the subject of the application to alleviate water shortages in this state.

5. The availability of alternative sources of water in the other state.

6. The demands placed on the applicant's supply in the other state.

7. Whether the proposed action is prohibited or affected by other law, including §§ 45-165 and 45-172 and chapter 2 of this title. [1]

D. This article does not authorize and the director shall not approve transporting from this state water allocated to this state by federal law or interstate compact.

E. An administrative hearing shall be held on the application, and the director shall give notice of the hearing by publication once a week for three consecutive weeks in a newspaper of general circulation in the county or counties from which the applicant proposes to transport the water. The hearing shall be conducted in the area from which water is proposed to be transported. Any interested person, including the department, may appear and give oral or written testimony on all issues involved.

F. Section 45-114, subsections A and B govern administrative proceedings, rehearing or review and judicial review of final decisions of the director under this section.

G. The director shall deposit, pursuant to §§ 35-146 and 35-147, all fees received under this section in the water resources fund established by § 45-117.

Credits

Added by Laws 1989, Ch. 168, § 3. Amended by Laws 1998, Ch. 57, § 79; Laws 2008, Ch. 153, § 1; Laws 2010, Ch. 282, § 7.

Footnotes

1 Section 45-401 et seq.

A. R. S. § 45-292, AZ ST § 45-292

Current through the First Regular Session and First Special Session of the Fifty-Second Legislature (2015)

End of Document

BEFORE THE
UNITED STATES OF AMERICA
FEDERAL ENERGY REGULATORY COMMISSION

Utah Board of Water Resources	)	Project No. P-12966-004
	)	Docket No. EL18-56-000
Lake Powell Pipeline Project	)	
	)	Comments

WESTERN RESOURCE ADVOCATES' COMMENTS ON THE ORIGINAL LICENSING PROCEEDING FOR THE LAKE POWELL PIPELINE PROJECT

Pursuant to 18 C.F.R. § 5.23, the "Notice of Application Accepted for Filing, Soliciting Motions to Intervene and Protests, Ready for Environmental Analysis, and Soliciting Comments, Recommendations, Terms and Conditions, and Prescriptions,"[1] as modified by the "Notice Suspending Procedural Schedule,"[2] and "Order Denying Petition for Declaratory Order on Jurisdiction,"[3] Western Resource Advocates (WRA) hereby submits comments and recommendations relevant to the Federal Energy Regulatory Commission's (FERC) and the Cooperating Agencies' environmental analysis. Western Resource Advocates submitted a motion to intervene in the above-captioned docket on October 11, 2018.[4]

Western Resource Advocates is a nonprofit conservation organization dedicated to protecting the Interior West's land, air, and water. We promote river restoration and water conservation, advocate for a clean and sustainable energy future, and protect public lands for present and future generations. Western Resource Advocates engages with utilities, state and federal government agencies, and irrigators to find solutions to meet growing urban water demands while protecting stream flows for fish, wildlife, and recreation.

In light of FERC's limited jurisdiction over the LPP, the Commission should hand off its lead agency role under NEPA to another agency with greater authority over the LPP and more experience evaluating

[1] eLibrary no. 20171211-3022 (Dec. 11, 2017).
[2] eLibrary no. 20180111-3085 (Jan. 11, 2018).
[3] eLibrary no. 20180920-3054 (Sept. 20, 2018).
[4] eLibrary no. 21181011-5133.

the environmental impacts of water supply pipelines. Nonetheless, should FERC move forward with preparing a draft environmental impact statement, the Commission must include a realistic No Action Alternative that properly accounts for current and future water demands, reasonable water conservation, reasonable reuse, and more agricultural water transfers. In addition, FERC must consider a reasonable range of alternatives, including a conservation alternative. FERC should also recognize that Arizona's Water Export Statute, A.R.S. § 45-292, as one of the required permit approvals for the LPP. Finally, because the LPP would move water from the Upper to the Lower Colorado River Basin, and bypass the Compact compliance location at Lee Ferry, FERC should consult with the other Basin States to ensure that permitting the LPP will not cause significant interstate conflict.

I. BACKGROUND

The Utah Board of Water Resources ("UBWR") submitted an application for a license under the Federal Power Act for the Lake Powell Pipeline Project ("Pipeline"), Federal Energy Regulatory Commission Project No. 12966, on April 30, 2016. The proposed Pipeline would be located in Washington and Kane Counties, Utah, and in Coconino and Mohave Counties, Arizona. Although the Pipeline, if approved, would be licensed to and constructed and operated by UBWR, the water delivered by the Pipeline would be used by the Washington County Water Conservancy District ("WCWCD") and the Kane County Water Conservancy District ("KCWCD") (collectively, the "Water Districts") for municipal and industrial water supply. Under the State of Utah's Lake Powell Pipeline Development Act, the State of Utah is the direct sponsor of the Pipeline. However, the Water Districts are the ultimate beneficiaries of the Pipeline and would be required to reimburse the State for the costs of developing the Pipeline.

The 140-mile proposed Pipeline would deliver water from Lake Powell, a federal reservoir in Arizona operated by the Bureau of Reclamation, to Sand Hollow Reservoir, near St. George, Utah for eventual distribution to the Water Districts' municipal and industrial water customers. To help cover the cover the costs of conveying this water, the Pipeline proposes to include a series of hydroelectric turbines

placed along the 89-mile downhill side of the Pipeline.[5] To this end, the Pipeline also proposes to include a pumped storage development in Washington County, Utah. Much of the proposed Pipeline would be located on public lands managed by the Bureau of Land Management.[6] UBWR plans to sell electricity generated by the Pipeline to regional transmission operators as an incidental purpose of the Pipeline.[7]

On December 11, 2017 the Federal Energy Regulatory Commission issued its Notice of Application Accepted for Filing, Soliciting Motion to Intervene and Protests, Ready for Environmental Analysis, and Soliciting Comments, Recommendations, Terms and Conditions, and Prescriptions ("NREA").[8] On December 27, 2017, UBWR petitioned the Commission urging the Commission to declare that the water delivery pipelines are part of the hydropower project and subject the Commission's jurisdiction under the Federal Power Act.[9] It concurrently moved for "the Commission to suspend the licensing proceeding immediately, and act expeditiously[.]"[10] On January 9, 2018 WRA filed an Answer opposing UBWR's motion for expedited action, and supporting UBWR's motion for suspension of the procedural schedule.[11]

On January 10, 2018 the Commission issued its Notice of Petition for Declaratory Order, and therein provided all interested parties to make comments and motions or petitions to intervene on or before February 12, 2018. On January 11, 2018 the Commission issued its Notice Suspending Procedural Schedule on the license application until after the Commission issues its decision on UWBR's Petition for Declaratory Order. Pursuant to these instructions, WRA filed a motion to intervene and comments in Project No. P-12966-005.[12]

On September 20, 2018 the Commission issued its Order Denying Petition on Declaratory Order for

[5] Application for Original License, Integrated Licensing Proposal (Public Filing) The Lake Powell Pipeline Project, FERC Project No. P-12966 at A-1 to -2 (April 30, 2016), eLibrary 20160502-5386.
[6] *Id.*, Draft Plan of Development – Pipeline and Hydro Facilities at 1-4 (describing proposed facilities that would be on land administered by the Bureau of Land Management).
[7] *See* Application at ES-7.
[8] eLibrary 20171211-3022.
[9] UBWR, "Petition for Declaratory Order on Jurisdiction, Motion for Expedited Action, and Motion for Suspension of Procedural Schedule," eLibrary no. 20171227-5166 (Dec. 27, 2017), p. 1 (Petition).
[10] *Id.* at 2.
[11] eLibrary 20180109-5125.
[12] eLibrary No. 20180212-5235.

Jurisdiction ("Jurisdictional Order").[13] In that Order, the Commission held that it would license only the hydroelectric generation facilities ("i.e., the generating facilities, primary transmission lines, and any necessary appurtenant structures, such as dams"[14]) contemplated as part of the proposed Lake Powell Pipeline project, but not the water conveyance system. The Commission also held that it "will not act as the ultimate decision maker for approving any portion of the overall project beyond the discrete hydropower facilities. In addition, the Commission will not be responsible for determining which alternative route for the water delivery pipeline should be chosen."[15] Finally, the Commission reinstated the comment and filing deadlines as they relate to the Commission's licensing of the discrete hydroelectric facilities as contained in the Commission's December 11, 2017 NREA.[16]

II. ANALYSIS

a. FERC's Limited Jurisdiction Over Only the Hydropower Components Demonstrates That FERC is Not the Proper Lead Agency for this Water Supply Project.

FERC should reconsider its role as the lead agency preparing an environmental impact statement under the National Environmental Policy Act (NEPA).[17] The Council on Environment Quality's regulations implementing NEPA set forth the following factors for determining the lead agency designation:

(1) The magnitude of the agency's involvement.
(2) Project approval/disapproval authority.
(3) Expertise concerning the action's environmental effects.
(4) Duration of agency's involvement.
(5) Sequence of agency's involvement.[18]

Most of these factors strongly favor the designation of an agency besides FERC as the lead agency under NEPA.

[13] Federal Energy Regulatory commission "Order Denying Petition for Declaratory Order on Jurisdiction", eLibrary No. 20180920-3043 (September 20, 2018).
[14] *Id.* at ¶ 68.
[15] *Id.* at ¶ 70.
[16] *Id.* at 71.
[17] 43 U.S.C. §§ 4321 *et seq.*
[18] 40 C.F.R. § 1501.5(c).

The Commission has a limited approval or disapproval authority over the LPP. As FERC recently stated in its Jurisdictional Order, the Commission has jurisdiction over the discrete hydropower components of the Lake Powell Pipeline, but not the Pipeline itself.[19] The Commission noted that it "will not act as the ultimate decision maker for approving any portion of the overall project beyond the discrete hydropower facilities. In addition, the Commission will not be responsible for determining which alternative route for the water delivery pipeline should be chosen."[20]

By contrast, most of the concern and controversy surrounding the LPP relates to the pipeline's potential location, the applicants' water supply and demand analyses, the potential impacts to the Colorado River, and other issues related to water supply management. The applicants concede that the LPP will be built primarily as a water supply pipeline and that the hydropower components' purpose is to "help offset" the pipeline's energy demands.[21] It follows that selection of a non-pipeline alternative would likely obviate the applicants' claimed need for the hydropower facilities considered in the PLP. Therefore, the incidental hydropower components are not the primary consideration for the agencies choosing between the LPP and alternatives.

FERC and the other permitting federal agencies should appoint a different and more appropriate lead agency to prepare an environmental impact statement for the LPP under NEPA. Although FERC has been involved as the planned lead agency for some time, the Commission's findings in its recent Jurisdictional Order make this is an appropriate time to reconsider FERC's role under NEPA as well. The federal agencies with jurisdiction over the pipeline as a whole have more comprehensive knowledge of the associated environmental issues and are better suited to being the lead agency for the NEPA process. Specifically, we urge FERC to hand off lead agency responsibilities to the Bureau of Reclamation, the Bureau of Land Management, the National Park Service, or the U.S. Army Corps of Engineers. Each of

[19] Jurisdictional Order at ¶ 67.
[20] *Id.* at ¶ 70.
[21] *See*, *e.g.*, UBWR's Response to Additional Information Request Sch. B, Item 1 (Oct. 24, 2016), eLibrary No. 20161024-5067 ("The peaking and pumped storage facilities are intended to generate revenue to help offset the cost of constructing and operating the water supply pipeline").

these agencies has broader permitting authority over the LPP or greater experience considering the potential environmental impacts of water supply pipelines.

b. The Final Application Fails to Present a Reasonable or Realistic No Action Alternative.

NEPA is the "basic national charter for protection of the environment."[22] "NEPA's intent is to 'focus[] the agency's attention on the environmental consequences of a proposed project,' [and] to 'guarantee[] that the relevant information will be made available to the larger audience that may also play a role' in forming and implementing the agency's decision.'"[23]

To fulfill these purposes, NEPA requires that federal agencies prepare a detailed environmental impact statement ("EIS") before undertaking "major Federal actions significantly affecting the quality of the human environment."[24] An EIS must include a rigorous analysis of alternatives to the proposed action that "sharply defin[es] the issues and provid[es] a clear basis for choice among options by the decisionmaker and the public."[25] This alternatives analysis "is at the heart of the environmental impact statement."[26] An EIS must also include a "no action" alternative.[27]

The proposed alternatives in the Utah Board of Water Resources' (UBWR or Board) *Final Study Report 22 Alternatives Development*[28] do not meet the basic requirements of NEPA. NEPA requires the Project Applicant to provide a rigorous analysis of alternatives.[29] However, UBWR fails to present a reasonable or realistic No Action Alternative or No Lake Powell Water Alternative for meeting Washington County Water Conservancy District's (WCWCD) and the other relevant entities' future water needs. Specifically, the Board offers only three limited alternative options:

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[22] 40 C.F.R. § 1500.1(a).
[23] *Davis v. Mineta*, 302 F.3d 1104, 1114 n.5 (10th Cir. 2002) (quoting *Robertson v. Methow Valley Citizens Council*, 490 U.S. 332, 349-50 (1989)) (alterations in original).
[24] 42 U.S.C. § 4332(2)(C).
[25] 40 C.F.R. 1502.14.
[26] *Id.*
[27] *Id.*
[28] *Available at* eLibrary No. 20160502-5386 (April 30, 2016).
[29] 40 C.F.R. 1502.14.

- **Advanced Treatment of Existing Supplies**: Treatment of Virgin River water supplies and wastewater reuse effluent by reverse osmosis (RO).
- **Water Conservation**: Eliminating residential outdoor irrigation with potable water.
- **Development of Local Supplies**: Conveying available groundwater from Kane County to Washington County by pipeline.

The Alternatives listed by UBWR are insufficient as described, and fail to recognize other viable options. In addition, the Board assumes unnecessarily large future water demands, which are based on weak conservation programs and poor data collection practices.[30] FERC should not accept UBWR's proposed alternatives because they are not reasonable or supported by administrative record, as required by NEPA.

i. Western Resource Advocates' update to the *Local Waters Alternative*

Western Resource Advocates presents the following Alternative, which is reasonable, cost-effective and represents the Least Environmentally Damaging Practicable Alternative. Specifically we propose the following Alternative Actions that will supplant the need for the Lake Powell Pipeline:

- **Advanced Treatment of Existing Supplies**: Treatment of Virgin River water supplies and wastewater reuse effluent by reverse osmosis (RO).
- **Water Conservation**: Water rates that encourage efficiency, land use policies to substantially increase water efficiency in new construction.
- **Development of Local Supplies**: Conveying available groundwater from Kane County to Washington County by pipeline. Transferring a more realistic volume of water from agricultural uses to municipal uses.
- **Water Data Management:** Universal metering of all culinary and secondary water deliveries, and improved tracking to inform water management and conservation efforts.

Western Resource Advocates presents here a realistic No Action Alternative based upon our *Local Waters Alternative to the Lake Powell Pipeline*[31] that corrects the flaws of the Project Applicant's alternatives proposal. In addition, our Alternative would incur less environmental harm than the applicant's proposed LPP action. Our alternative shows how Washington County can pursue water conservation, water reuse, and conversion of agricultural water to Municipal and Industrial (M&I) uses to meet future water needs and avoid construction of a costly and environmentally damaging water supply pipeline.

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[30] *See infra*.

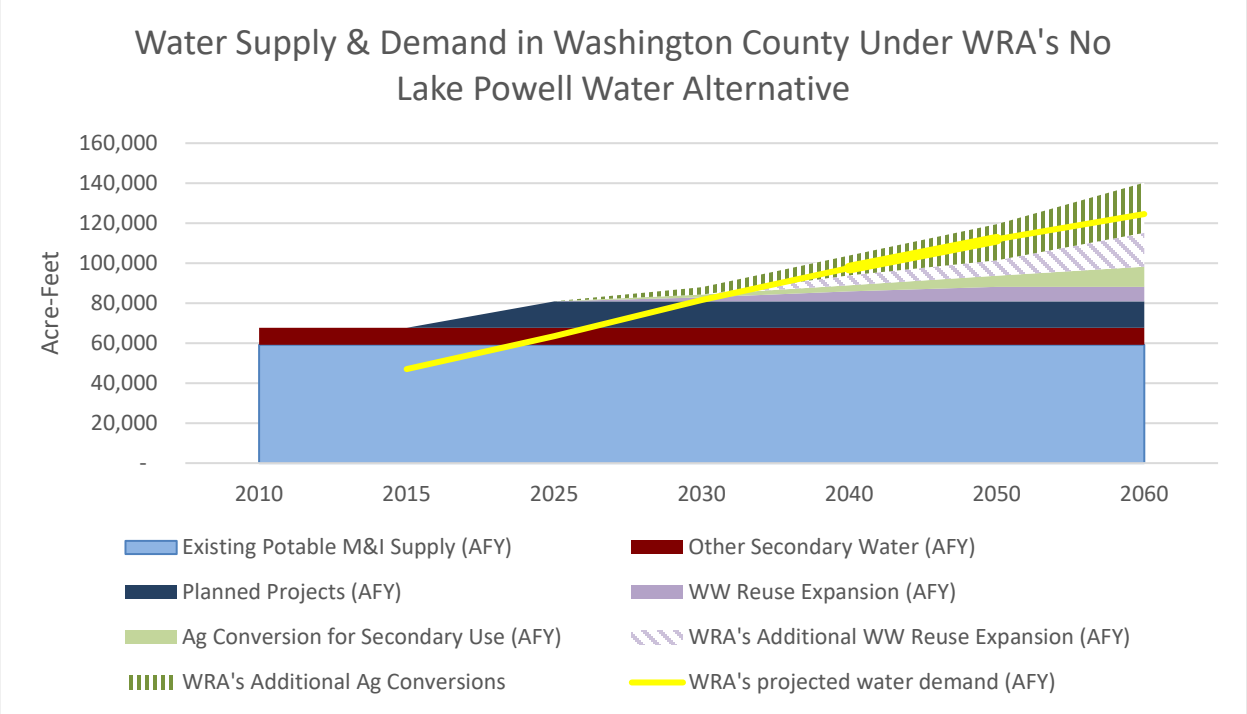
[31] Amelia Nuding, Western Resource Advocates, Local Waters Alternative to the Lake Powell Pipeline (Mar. 13, 2013), eLibrary 20130314-5010.

In 2013 Western Resource Advocates submitted the *Local Waters Alternative* to FERC as a reasonable and realistic No Action Alternative to the LPP. Although the project applicants have since updated some of their data related to population growth, water supply, and water demand, the central conclusions of the *Local Waters Alternative* remain unchanged:

- The *Local Waters Alternative* (or a similar set of approaches) more than meets future water needs in Washington County;
- Implementation of reasonable and cost-effective conservation measures would substantially lower future water demand projections;
- Reuse and agricultural water transfers can provide significant amounts of new water supply to meet projected water needs;
- The *Local Waters Alternative* costs significantly less than the proposed LPP.

Figure 1 is a graphical summary of Western Resource Advocates' No Action Alternative, as described in the *Local Waters Alternative.* Figure 1 has been updated with the latest data on population projections, water supplies and water demand, illustrating that WRA's proposed solutions remain viable today.

Figure 1. A graphical summary of WRA's Alternative to the Lake Powell Pipeline



Our analyses uses much of the same data provided by the project applicants, but also has some important differences, as explained here:

- WRA's population projection match those used in the Final Study Reports 22 and 19.

- WRA uses most of same water supplies as reported by WCWCD in Final Study Report 22 Alternatives Development (Table 3-1): Existing potable M&I Supply, Planned Projects, Wastewater Reuse Expansion, Other Secondary Water, and Agricultural Conversion for secondary use.
- WRA does not include any water from the LPP, nor does it include UBWR's water from "Additional Wastewater Reuse Expansion Beyond Existing Capacity." Instead, WRA uses our own projected volume of reuse water, which is lower due to decreased supply from residents due to conservation.
- WRA adds in additional water resources from expanded agricultural water conversions, as would be expected from the significant population growth that would occur on agricultural lands, permanently changing the use of those lands.
- WRA uses the more recent and accurate 2015 water demand from the Division of Water Resources[32] as the baseline for water demand, instead of the less accurate 2010 baseline provided by UBWR. We apply a 1% per capita conservation rate per year, which is explained further in section IIc.

ii. WRA's Alternatives to the LPP are Less Expensive than the Proposed Project.

The Local Waters Alternative proposes cost-effective strategies to meet WCWCD's reasonable future water needs, including:

- Improved tiered-rate structures that reflect the true cost of water rather than the currently low-water rates that are combined with property tax revenue for the district;
- New construction codes that ensure water-efficient new development is built using standard techniques like: soil amendment, efficient irrigation systems and native, low-water using plants;
- Full metering of all culinary and secondary water to more precisely track water usage and trends, and subsequently focus water efficiency program efforts where they will achieve the most significant savings for the dollars invested.

In contrast, UBWR's Application presents a false choice between building an expensive water supply pipeline to support unreasonably high per capita water use rates, and the permanent elimination of outdoor watering with potable water supplies. This is not only a virtually unheard of conservation technique for long term water management, it ignores the less expensive and more commonly utilized conservation options described above.

The Local Waters Alternative concludes that the LPP would cost substantially more than the Alternatives. Figure 2, below, depicts the original conclusions of the Local Waters Alternative, which have not been updated since its release in 2013, but are still representative of the relative costs.

[32] Utah Division of Water Resources, Utah's Open Water Data, https://dwre-utahdnr.opendata.arcgis.com/datasets/mnireport2015-counties (last visited September 5, 2018).

Figure 2. The cost of the Local Waters Alternative is about 1/3 the cost of the Lake Powell Pipeline, with some infrastructure costs undetermined. All costs assume a 4.14% discount rate.

	Local Waters Alternatives	**Lake Powell Pipeline**
Conservation Costs	$236.1 million	
Reuse	$130.1 million	
Agriculture	$34.4 million + infrastructure costs	
TOTAL COSTS	**$410.3 million + infrastructure costs**	**$1,261.3 million**

UBWR's Application does not provide a direct cost comparison between the proposed Lake Powell Pipeline and all reasonable project alternatives, including the No Action Alternative. However, the Local Waters Alternative is viable, less environmentally damaging, and less expensive than the proposed Lake Powell Pipeline project. This plan realistically represents what the project beneficiaries would actually do in the event of the denial of a necessary permit. Therefore, the Local Waters Alternative should be used as the No Action Alternative.

c. Project Applicants Greatly Exaggerate Current and Future Water Demands.

FERC should not accept UBWR's baseline current and future water demands. UBWR reports that WCWCD's system-wide per-capita water demands were 325 gallons per person per day (gpcd) in 2010, and they will be 311 gpcd by 2020.[33] These figures have changed substantially since the draft reports. Moreover, recent data from the Division of Water Resources reports that per capita water demands in 2015 in Washington County were only 303 gpcd, lower than the water use figures used by the Project Applicants.[34]

The Division of Water Resources notes that these data cannot be directly compared with data from previous years, due to numerous differences and improvements in data collection and reporting

[33] Final Study 19, Table 3-3, pg. 3-5, eLibrary 20160502-5386.
[34] Utah Division of Water Resources, Utah's Open Water Data, https://dwre-utahdnr.opendata.arcgis.com/datasets/mnireport2015-counties (last visited September 5, 2018).

methodologies. The improved data collection methodologies were largely a result of the findings of Legislative Auditor General's 2015 report, which concluded that "[t]he Division does not have reliable local water use data."[35] Therefore, FERC should use the more recent data from 2015 as their baseline per capita water demands, and adjust future projections accordingly. This adjustment would result in lower – and more accurate – projected future water demands.

UBWR's future water needs projections are also unrealistically high, and severely underestimate the role that water conservation can play in reducing demand for water. Figure 3 below compares UBWR's projected water demands with WRA's projections. UBWR assumes that per capita water usage does not change between 2030 and 2050, yet fails to supply any justification for keeping water use rates static for two decades.

Figure 3. A comparison of anticipated per capita water use by WCWCD and Western Resource Advocates (data from Final Study 19, Table 3-3, page 3-5).

Year	WCWCD Per Capita Use with Conservation(gpcd)	Western Resource Advocates' Per Capita Use with Conservation
2010	325	
2015		303
2020	311	288
2030	295	260
2040	295	235
2050	295	213
2060	285	192

It is inaccurate and inappropriate to assume that future water demands will not decline over a period of 20 or more years. Water demands will undoubtedly decline every year due to simple replacement of old, higher water-using fixtures (e.g. toilets, showerheads, faucets) with new, more-efficient models. Notably,

[35] OFFICE OF THE LEGISLATIVE AUDITOR GENERAL, STAT OF UTAH, A PERFORMANCE AUDIT OF PROJECTIONS OF UTAH'S WATER NEEDS. REPORT OF THE UTAH LEGISLATURE NO. 2015-01 (MAY 2015). pg ii.

the USGS has documented a national trend of declining per capita water use in the municipal sector since 2005.[36] And regionally, a 2011 Pacific Institute report documented 100 cities and water agencies in the Colorado River Basin, finding that "the majority of people receiving water from the Colorado River basin live in areas where per capita deliveries dropped an average of at least one percent per year from 1990 to 2008."[37] Some of the water agencies that achieved per capita declines of 1% or more per year are located in Utah, namely Salt Lake City, Provo, West Jordan, Orem, Springville and Pleasant Grove, indicating that this trend is not unique to other states.[38] Therefore, the minimal reductions in per capita water use proposed by UBWR are unrealistic and unreasonable.

In conclusion, UBWR's analysis of future water demands is unsupported and is greatly inconsistent with well-documented regional trends toward reduced per capita water requirements over time. As a result of UBWR's incorrect baseline water use data, and unreasonable assumptions regarding water conservation and efficiency, future water demand projections are grossly inflated and unrealistic. FERC should not accept UBWR's baseline and future water use analyses into the Commission's draft EIS.

d. Uncertainty Regarding the Boundaries of Grand Staircase Escalante National Monument Prevents Accurate Environmental Analysis of the Proposed Pipeline and its Accompanying Hydroelectric Facilities at This Time.

The 140-mile proposed Pipeline would deliver water from Lake Powell, a federal reservoir in Arizona operated by the Bureau of Reclamation, to Sand Hollow Reservoir, near St. George, Utah for eventual distribution to municipal and industrial water customers. The proposed Pipeline also contemplates that facilities will be constructed near, and possibly within, the Boundaries of Grand Staircase Escalante National Monument.[39] However, the boundaries of Grand Staircase Escalante National Monument are

[36] United State Geological Survey. 2018. Summary of Estimated Water Use in the United State in 2015. https://pubs.usgs.gov/fs/2018/3035/fs20183035.pdf. Attached hereto as Exhibit "A".
[37] Cohen, M. J. 2011. Municipal Deliveries of Colorado River Basin Water. Pacific Institute. pg. iii. http://www.pacinst.org/reports/co_river_municipal_deliveries/. Executive Summary is attached hereto as Exhibit "B".
[38] *Id*. at 31.
[39] Application for Original License, Integrated Licensing Proposal (Public Filing) The Lake Powell Pipeline Project, FERC Project No. P-12966 at Exhibit G (April 30, 2016), eLibrary 20160502-5386.

currently subject to federal litigation. [40] The unresolved question central to that lawsuit is whether President Trump violated the Antiquities Act when he reduced the previously established boundaries of Grand Staircase Escalante National Monument.

The lawsuit's claims have merit and the case may result in the restoration of the Monument's previous boundaries. The Antiquities Act of 1906 ("Act") delegates to the President the authority to "declare" historic landmarks, historic and prehistoric structures, and other "objects" of historic or scientific interest on Federal lands to be national monuments and to "reserve parcels of land as part of the national monuments."[41] Through the Act, Congress sought to ensure lasting protection for the nation's historic, cultural, and scientific heritage.

In passing the Act, Congress was intentional in delineating the scope of the President's authority over national monuments. The clear text of the Act specifies the President's authority to create monuments and places limits on the purposes for which a monument may be established and the scope of a monument. It does not, however, give the President any authority to reduce, diminish, or modify monuments. This clear intent is supported by the Act's overriding protective purpose and Congress' goal of providing permanent protection to national treasures that are located on federal lands.

The Act authorizes the President to reserve as national monuments parcels of land which are "the smallest area compatible with the proper care and management of the objects to be protected."[42] In placing this limit on monument designations, Congress gave the President broad authority to declare areas as monuments, conditioned upon this scope requirement. Thus, any monument that exceeds the "smallest area compatible" standard does not meet the Act's requirements. But this limitation does not provide a subsequent President the authority to second-guess the geographical boundaries required to properly protect the designated objects; rather, it simply limits the President's ability to determine the scope of national

[40] Consolidated Cases in the U.S. District Court for the District of Columbia, *The Wilderness Society, et al. v. Donald Trump et al.* Case No. 1:17-cv-02587 (TSC) & *Grand Staircase Escalante Partners et al. v. Donald Trump et al.*, 1:17-cv-02591 (TSC).
[41] 54 U.S.C. § 320301.
[42] 54 U.S.C. § 320301.

monuments in the first instance to the area necessary to protect the declared objects.

Since its passage in 1906, presidents have used the Act for precisely this purpose: to protect important "objects" by reserving parcels of land to provide enduring protection. Over the last century, some of the monuments created under the Antiquities Act have later become some of the nation's most treasured national parks (Grand Canyon, Olympic, Zion, Bryce Canyon, and Glacier Bay national parks, among others), and many national monuments, such as Cascade-Siskiyou, Sonoran Desert, and Grand Staircase-Escalante National Monument are widely recognized for their irreplaceable natural features.

If the Federal Energy Regulatory Commission proceeds with an environmental analysis and permitting of the Lake Powell Pipeline at this time, the agency risks placing itself in the middle of the dispute over the status of Grand Staircase Escalante National Monument. This creates a high degree of uncertainty as to whether any of the environmental analysis work done during this uncertain time will be accurate, or may be relied upon to issue a Record of Decision or permit for the proposed pipeline. Grand Staircase Escalante National Monument encompassed nearly 1.7 million acres when proclaimed by President Clinton in 1996.[43] Through the Proclamation, President Clinton designated objects of historic and scientific interest and set aside the "smallest area compatible with the proper care and management" of those objects.[44]

Subsequently, in 1998, Congress passed (and the President signed) two bills which implicitly ratified Grand Staircase Escalante National Monument's designation and borders ("1998 Legislation"). First, Congress added lands to and removed lands from the 1996 Monument boundaries. [45]Second, Congress authorized the transfer of 176,699 acres of land and mineral interests from state to federal ownership, thereby expanding Grand Staircase Escalante National Monument's footprint, in exchange for a monetary payment and a transfer of other federal lands outside of the Monument area to the State of Utah.[46] The lands

[43] Proclamation 6920, "Establishment of the Grand Staircase-Escalante National Monument," 61 Fed. Reg. 50223, 50225 (Sept. 24, 1996).
[44] *Id.*; 54 U.S.C. § 320301.
[45] Act of November 6, 1998, Pub. L. No. 105-355, §§ 201–202, 112 Stat. 3247, 3252–53.
[46] Utah Schools and Lands Exchange Act, Pub. L. No. 105-335, § 2, 112 Stat. 3139, 3139 (Oct. 31, 1998).

transferred to federal ownership included lands administered by the Utah School and Institutional Trust Lands Administration (SITLA). As a result, through the 1998 Legislation, Congress confirmed Grand Staircase Escalante National Monument's boundaries by adjusting and expanding the Monument's footprint via Congressional land exchange.

In direct contravention of congressional ratification and recognition that the boundaries after the 1998 Legislation were the proper boundaries under the Act, on December 4, 2017, President Trump issued a proclamation shrinking the boundaries of the Monument.[47] Concluding without substantiation that the boundaries established by President Clinton were "greater than the smallest area compatible with the protection of the objects for which lands were reserved," President Trump shrunk the Monument into three distinct areas: Grand Staircase, Kaiparowits, and Escalante Canyons (the 2017 Units), thereby diminishing the Monument by nearly half.[48] The remaining three units cover only 58% of the Monument's original area and specifically exclude many objects designated by the original proclamation.[49] Contrary to the limited authority of the Antiquities Act (which does not include diminishing or shrinking a previously-proclaimed national monument) and Congress' ratification of the purpose and boundaries of the Monument, President Trump made the erroneous finding in the 2017 Proclamation that these three shrunken units "will ensure that the monument is no larger than necessary for the proper care and management of the objects."[50] While this matter is not yet resolved, its current litigation status suggests that no federal or state agency should be building infrastructure in or around the disputed boundaries of Grand Staircase Escalante National Monument.

The question of monument boundaries is even more complicated, and directly related to possible placement of Lake Powell Pipeline facilities. Notably, in the 1998 Utah Schools and Lands Exchange Act Congress explicitly validated the significance of the Monument objects and the importance of conserving,

[47] Proclamation 9682, "Modifying the Grand Staircase-Escalante National Monument," 82 Fed. Reg. 58089, 58093 (Dec. 8, 2017).
[48] *Id.* at 58091.
[49] *Id.* at 58093.
[50] *Id.*

inter alia, the "substantial . . . natural resources" including the "rare plant and animal communities" within the extent of the entire Monument. [51] Moreover, it deemed Grand Staircase Escalante National Monument as one "of the most renowned conservation land units in the United States."[52] Congress also acknowledged that "[d]evelopment of surface and mineral resources on [...] lands within Grand Staircase Escalante National Monument could be incompatible with the preservation of these scientific and historic resources for which the Monument was established." [53] This suggests that the development of pipeline facilities within the boundaries of Grand Staircase Escalante National Monument would also be incompatible with the preservation of its scientific and cultural resources. With the boundaries of the Monument in question, and therefore which resources are still entitled to the full protection of Monument status as stated in the 1998 Utah Schools and Lands Exchange Act, it would be imprudent for the Federal Energy Regulatory Commission to proceed with any environmental analysis at this time. Only after the dispute involving Grand Staircase Escalante National Monument's Boundaries has been settled should the Federal Energy Regulatory Commission, or any federal agency, perform environmental analysis of the section of the proposed Lake Powell Pipeline that would traverse the Monument's boundaries. There is a high likelihood that the outcome of the present litigation will greatly impact any licensing decisions made regarding the Lake Powell Pipeline and its proposed facilities that would traverse Grand Staircase Escalante National Monument.

e. FERC Must Consider Conservation Alternatives in Detail in the Draft Environmental Impact Statement.

Under NEPA,[54] federal agencies must consider a full range of alternatives to the proposed action in an environmental impact statement.[55] The alternatives analysis is the "heart" of a NEPA document, and the statute's implementing regulations direct the Bureau to "[r]igorously explore and objectively evaluate

[51] Utah Schools and Lands Exchange Act, Pub. L. No. 105-335, § 2, 112 Stat. 3139, 3139 (Oct. 31, 1998).
[52] *Id.* at 3141.
[53] *Id.* at 3139.
[54] 42 U.S.C. §§ 4321 *et seq*.
[55] 42 U.S.C. § 4332(C)(iii).

all reasonable alternatives."[56] A "viable but unexamined alternative renders [the] environmental impact statement inadequate."[57] For example, in *New Mexico ex rel. Richardson v. Bureau of Land Management*, the Tenth Circuit remanded the environmental impact statement and record of decision for the Otero Mesa resource management plan amendment because BLM's conservation alternative "was a far cry" from the most protective alternative allowable under law.[58] Accordingly, FERC has a duty to evaluate all reasonable action alternatives that will avoid impacts to the Colorado River, public lands, wildlife habitat, or other important natural values.

In the context of the LPP, a viable conservation action alternative could include a smaller-sized (*i.e.*, fewer acre-feet in capacity) water supply pipeline project that integrates many of the conservation actions in the Local Waters Alternative. Another potential option is a "conservation first" alternative that requires the implementation of conservation measures, and the attainment of water demand thresholds, prior to the construction of the LPP. These ideas are merely illustrative, and not necessarily exhaustive, of the possible action alternatives that FERC would be required to consider in the draft EIS.

f. The Local Waters Alternative Demonstrates that a Practicable No Action Alternative is Available and Must be Considered in the Draft EIS.

Due to the UBWR's planned discharges of dredge and fill material, the Clean Water Act imposes a substantive limit to the Corps' discretion here, even as a cooperating agency, such that it may only select the least environmentally damaging practicable alternative. Under Guidelines implementing Section 404(b)(1) of the Clean Water Act:

> the Corps may not issue a [dredge or fill] permit if there is a practicable alternative to the proposed discharge which would have less adverse impact on the aquatic ecosystem, unless the alternative has other significant adverse environmental consequences. A practicable alternative is one that is available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.[59]

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[56] 40 C.F.R. § 1502.14(a); *see also Utahns for Better Transp. v. U.S. Dept. of Transp.*, 305 F.3d 1152, 1166 (10th Cir. 2002).
[57] *Citizens for a Better Henderson v. Hodel*, 768 F.2d 1051, 1057 (9th Cir. 1985).
[58] 565 F.3d 683, 711 (2009).
[59] *Greater Yellowstone Coal. v. Flowers*, 359 F.3d 1257, 1269 (10th Cir. 2004) (internal quotations omitted; quoting 40 C.F.R. § 230.10(a)).

The purpose for severely constraining the Corps' discretion when considering dredge and fill applications is straightforward:

> dredged or fill material should not be discharged into the aquatic ecosystem, unless it can be demonstrated that such a discharge will not have an unacceptable adverse impact either individually or in combination with known and/or probable impacts of other activities affecting the ecosystems of concern. . . . From a national perspective, the degradation or destruction of special aquatic sites, such as filling operations in wetlands, is considered to be among the most severe environmental impacts covered by these Guidelines. The guiding principle should be that degradation or destruction of special sites may represent an irreversible loss of valuable aquatic resources.[60]

The Corps' burden under the Clean Water Act is especially steep where, as here, the preferred alternative does not appear to be "water dependent."[61] In cases like this one,

> [T]he presumption is that there are practicable alternatives that do not involve special aquatic sites and that these alternatives do have less adverse impact on the aquatic ecosystem. These presumptions hold unless clearly demonstrated otherwise. [The Tenth Circuit has] thus held that in such a case, the Corps may not issue a § 404 permit unless the applicant, with independent verification by the Corps, provides detailed, clear and convincing information ***proving*** that an alternative with less adverse impact is impracticable.[62]

If the information in the record is insufficient to determine the existence of practicable alternatives, the dredge and fill permit must be denied.[63] Finally, EPA is authorized to veto any proposed dredge and fill activity that will, among other things, "have an unacceptable adverse impact to . . . fishery areas (including spawning and breeding areas), wildlife, or recreation areas."[64]

Accordingly, FERC's failure to include a realistic and practicable No Action Alternative in the draft EIS, such as the Local Waters Alternative, would violate the Clean Water Act. FERC should not unquestioningly accept UBWR's unrealistic and draconian No Action Alternative that would simply end treated outdoor watering in WCWCD's service area. It is far more likely that in the event of a section 404 permit denial, WCSCD would pursue the proven water conservation measures in the Local Waters

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[60] 40 C.F.R. § 230.1 (c), (d).
[61] *Id.* at 230.10(a)(3).
[62] *Greater Yellowstone Coal.*, 359 F.3d at 1269 (emphasis in original; internal quotations omitted; quoting 40 C.F.R. § 230.10(a)(3) and *Utahns for Better Transp.*, 305 F.3d at 1186-87).
[63] *Greater Yellowstone Coal.*, 359 P.3d at 1269.
[64] 33 U.S.C. § 1344(c).

Alternative, rather than take the extraordinary and unpopular step of ending all outdoor water use with treated water.

g. The Application Fails to List Arizona's Water Export Statute, A.R.S. § 45-292, Among the Required State Permits for the LPP.

The Arizona Water Export Statute expressly prohibits transporting water from Arizona for consumptive use in another state without approval by the Director of the Arizona Department of Water Resources.[65] In the proposed LPP, the Utah Division of Water Resources plans to pump stored water from Lake Powell at a point in Arizona and transport that water via pipeline for consumptive use in Utah. Therefore, the plain terms of the Arizona Water Export Statute apply to the current plans for the Lake Powell Pipeline.

However, despite our previous comment on this issue regarding the PLP, there is still no mention of A.R.S. § 45-292 in the relevant section of the Application.[66] Under A.R.S. § 45-292, the Director must hold a formal administrative hearing on the application and consider statutory factors in determining whether to grant, condition, or deny the application to move water out of Arizona.[67] FERC should note this requirement for a permit to export water from Arizona in it its evaluation of the LPP.

h. Exports of Water via Pipeline from the Upper Basin to the Lower Basin are Potentially Illegal Under the Colorado River Basin Compact of 1922.

The proposed LPP would divert water from Upper Basin pursuant to Utah's entitlement under the Colorado River Compact for use in the part of Utah that is in the Lower Basin. This is potentially problematic because the Compact apportions 7.5 million acre feet each from the Colorado River to the

[65] A.R.S. § 45-292; *see also id.* at 45-101(3) (defining the "director" as the Director of the Arizona Department of Water Resources).
[66] *See* Application at ES-8 (Table 2-1).
[67] Article IX(a) of the Upper Colorado River Basin Compact (UCRBC) does not preempt Arizona's ability to reject an application for the Lake Powell Pipeline. Both Arizona and Utah are signatories to the UCRBC. Article IX(a) only protects the consumptive interstate water projects of a "lower," *i.e.* downstream, signatory state against the protectionist laws of an "upper", *i.e.* upstream, signatory state. The Colorado River never re-enters Utah below Lake Powell in Arizona. Therefore, the proposed Lake Powell Pipeline is not protected by Article IX(a) of the UCRBC.

Upper and Lower Basins.[68] Notably, this apportionment is to the geographic regions in each basin and not directly to the states.[69] Certainly many basin states export Colorado River water out of the basin entirely. However, we are not aware of a precedent for moving water from the Upper Basin to the Lower Basin in a way that bypasses the Compact compliance location at Lee Ferry, Arizona. Given that the LPP would effectively reduce water available for consumptive use in the Upper Basin, and expand consumptive use in the Lower Basin beyond what is apparently contemplated in the Compact itself, there is a legitimate question about whether such an action comports with the Colorado River Compact. At a minimum, to avoid creating conflict within the basin, FERC should ensure that the other basin states agree with Utah's apparent interpretation of the Colorado River Compact as allowing such Upper to Lower Basin transfers that bypass Lee Ferry.[70]

i. The Cooperating Agencies Should Propose Conditions for the Proposed FPA Permit.

In light of the extensive potential impacts of the LPP to the Colorado River, public lands, and other natural values, we urge the cooperating agencies to propose permit conditions that will protect the natural environment. In the event that such conditions are proposed, Western Resource Advocates reserves its right to propose alternatives or potentially request a trial-type hearing at a later date.

III. CONCLUSION

Western Resource Advocates respectfully requests that FERC decline lead agency status for preparation of the draft EIS under NEPA. Nonetheless, should the agency proceed, the draft EIS should be prepared in a manner that is consistent with these comments. Finally, we urge the cooperating agencies to propose protective conditions that should apply to any eventual FPA permit.

Dated November 16, 2018 Respectfully submitted,

/s/ Ariel C. Calmes

[68] Colo. R. Compact, Art. III(a).
[69] *Id.* at Art. II(f), (g) (defining the "Upper Basin" and the "Lower Basin" as "those parts of the States . . . from which waters naturally drain into the Colorado River System . . . ."
[70] *See* Comment of the Colorado Water Conservation Board, *available at* FERC eLibrary 20110506-5150 (May 6, 2011).

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DECLARATION OF SERVICE

Utah Department of Water Resources, Division of Water Resources,
Lake Powell Pipeline Project (P-12966)

I, Ariel Calmes, hereby certify that on this 16th day of November, 2018, I have served a copy of the forgoing **Western Resource Advocates' Comments** electronically, or if no email address is provided, by first-class mail per Commission direction upon each person designated on the official Service List.

/s/ Ariel C. Calmes

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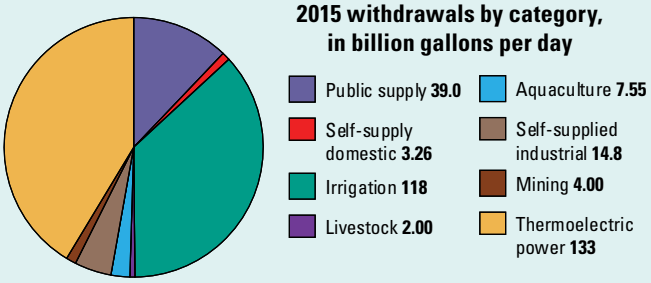
EXHIBIT A

Summary of Estimated Water Use in the United States in 2015



- Total withdrawals in 2015, were **322** billion gallons per day (Bgal/d), resulting in a **9** percent decrease since 2010
- Since 2010, population increased **4** percent and total domestic use decreased **3** percent, which reduced per-capita use to **82** gallons per day
- Consumptive use accounted for **62** percent of water used for irrigation, and **3** percent of water used for thermoelectric power in 2015
- Withdrawals for thermoelectric power, irrigation, and public supply accounted for **90** percent of total withdrawals in 2015

A total of **322** Bgal/d of water withdrawals was reported for eight categories of use in the United States in 2015, which was 9 percent less than in 2010 (**354** Bgal/d), and continued a declining trend since 2005. The decline in total withdrawals in 2015 primarily was caused by significant decreases (**28.8** Bgal/d) in thermoelectric power, which accounted for **89** percent of the decrease in total withdrawals. Between 2010 and 2015, withdrawals decreased in all categories except irrigation (**2** percent increase), mining (**1** percent increase), and livestock (**no change**). Fresh surface-water withdrawals (**198** Bgal/d) were **14** percent less than in 2010, and fresh groundwater withdrawals (**82.3** Bgal/d) were about **8** percent more than in 2010. Saline surface-water withdrawals (**38.6** Bgal/d) were **14** percent less than in 2010, and saline groundwater withdrawals (**2.34** Bgal/d) were 5 percent more than in 2010. Total population in the United States in 2015 (**325** million) increased by **4** percent (**12.4** million) from 2010, which was similar to the increase between 2005 and 2010. For the first time since 1995, consumptive use for irrigation and thermoelectric power were reported. Consumptive use accounted for **62** percent (**73.2** Bgal/d) of water used for irrigation, and **3** percent (**4.31** Bgal/d) of water used for thermoelectric power in 2015.

Water Use by Category

Withdrawals for thermoelectric power, irrigation and public supply accounted for 90 percent of total withdrawals in the United States. Withdrawals by category and State, arranged from west to east (fig. 1) indicate the general geographical pattern of water use across the country. Thermoelectric-power withdrawals were prominent in the east and irrigation withdrawals were prominent in the west. Public-supply withdrawals are greatest in the states with the largest population centers.

Withdrawals for **public supply** were about 12 percent (39.0 Bgal/d) of total withdrawals, and 61 percent of public-supply withdrawals were from surface-water sources. Public-supply systems deliver water to domestic, industrial, commercial, and other users, and 60 percent of public-supply withdrawals provided 87 percent of the United States population (283 million) for domestic indoor and outdoor residential uses. Other residences are self-supplied from wells or other sources; these withdrawals were about 1 percent (3.26 Bgal/d) of total withdrawals and provided water to about 13 percent (42.5 million) of the United States population. Groundwater was used for 98 percent of the self-supplied domestic withdrawals.

Withdrawals for **irrigation** were 37 percent (118 Bgal/d) of total withdrawals, and 42 percent of freshwater withdrawals. Lands irrigated with sprinkler or micro-irrigation systems accounted for 63 percent of total irrigated lands. Surface water supplied about 52 percent of the total irrigation withdrawals. The 17 conterminous Western States accounted for 81 percent of total irrigation withdrawals, and 74 percent of the total irrigated lands in the United States.

Withdrawals for **livestock** and **aquaculture** combined were 3 percent of the total withdrawals for all categories in 2015. Total withdrawals for livestock were 2.00 Bgal/d and 62 percent was from groundwater. Total withdrawals for aquaculture were 7.55 Bgal/d and 79 percent were from surface water.

Self-supplied industrial withdrawals were almost 5 percent (14.8 Bgal/d) of total withdrawals, and surface water provided 82 percent. Withdrawals for **mining** were about 1 percent (4.00 Bgal/d) of total withdrawals, and groundwater supplied 72 percent, mostly (65 percent) from saline water.

Water used for **thermoelectric power** accounted for 41 percent of total withdrawals (133 Bgal/d), and surface water supplied almost all withdrawals; 72 percent of the surface-water withdrawals were freshwater. Powerplants that used once-through cooling systems accounted for 96 percent of all thermoelectric-power withdrawals. More than 25 percent of thermoelectric-power withdrawals and power production was in Texas, Florida, Illinois, and Michigan.

Water Use Trends, 1950-2015

Every 5 years since 1950, the U.S. Geological Survey (USGS) has compiled and estimated water-use information in cooperation with State, Federal, and local agencies, making it possible to evaluate water-use trends through time. Total withdrawals steadily increased from 1950 (180 Bgal/d) to the peak in 1980 (430 Bgal/d), declined in 1985 (397 Bgal/d), and then remained fairly steady until 2005 (410 Bgal/d). The sharp decline in 2010 (354 Bgal/d) has continued through 2015 (322 Bgal/d). Total withdrawals for 2015 were lower than 1970, and were about the same as 1965 (310 Bgal/d). Thermoelectric-power withdrawals increased from 1950 to 1980, then fluctuated slightly through 2005, and since 2005 have declined sharply because of increased efficiency and closures of plants with once-through cooling systems. Irrigation withdrawals steadily increased from 1950 to 1980, when they peaked (150 Bgal/d), then remained steady through 2005 (127 Bgal/d), declined in 2010 (116 Bgal/d) and slightly increased in 2015 (118 Bgal/d). The trend toward using more efficient irrigation systems continued with 10 percent more irrigated lands using sprinkler systems (including micro-irrigation) in 2015 than in 2010; lands using surface (flood) irrigation systems decreased by 11 percent. Although population within the United States has steadily increased since 1950, public-supply withdrawals have varied. Public-supply withdrawals gradually increased from 1950 (14 Bgal/d), to a peak in 2005 (44.4 Bgal/d), decreased for the first time in 2010 (42.0 Bgal/d), and have continued to decrease at 7 percent in 2015 (39.0 Bgal/d). Less water was used for domestic purposes in 2015 than in 2010, which resulted in a decrease of the total domestic per-capita use rate from 88 gallons per capita per day (GPCD) in 2010, to 82 GPCD in 2015. Trends for combined categories of industrial, mining, aquaculture, livestock, and commercial (reported from 1985 to 1995), show that total combined withdrawals were steady from 1950 to 1985, then decreased in 1985, mostly because of large decreases in industrial withdrawals between 1980 and 1985. This decreasing trend has continued until 2015, even though livestock, mining, and aquaculture uses have increased over time.

Importance of Water-Use Data for the United States

The most recent USGS publication of water-use data that is part of the series of reports that began in 1950, and is the basis of this summary, is USGS Circular 1441, "Estimated use of water in the United States in 2015" (Dieter and others, 2018) along with a data release (Dieter and others, 2017). Federal, State, and local agencies have a key role in the collection and dissemination of water-use data. By compiling and publishing water-use estimates for the Nation, the USGS provides water-resource planners with the information needed to address issues related to water-resource allocation and environmental effects at National, regional, and State levels. Water-use data also is a key component of the water-budget approach for the National Water Census (http://water.usgs.gov/watercensus), which is a primary effort of the USGS Water Availability and Use Science Program (https://www.usgs.gov/science/mission-areas/water/water-availability-and-use-science-program) that includes research to improve methods of collection and estimation of water-use data.

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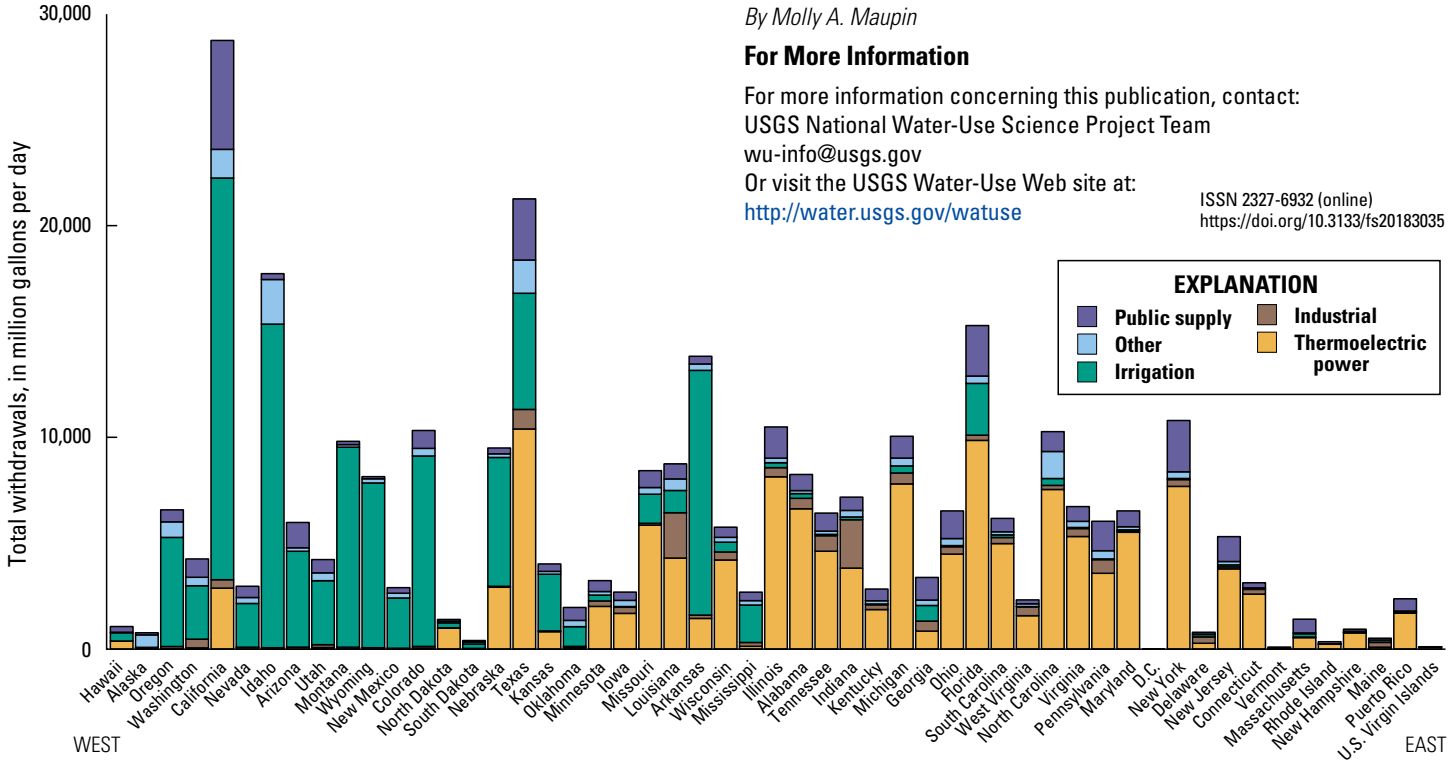

Figure 1. Withdrawals by category in 2015. States are arranged geographically from west to east. Units are in million gallons per day (Mgal/d); 1 billion gallon per day is equal to 1,000 Mgal/d.

EXHIBIT B

Municipal Deliveries of Colorado River Basin Water

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Cover Photo: Aerial view of the Whitsett Pumping Plant, Courtesy © The Metropolitan Water District of Southern California

Note – this 6/27/2011 revision corrects population data for the City of Westminster and water delivery data for Denver Water.

About the Pacific Institute

The Pacific Institute is one of the world's leading independent nonprofits conducting research and education to create a healthier planet and sustainable communities. Based in Oakland, California, with an office in Boulder, Colorado, we conduct interdisciplinary research and partner with stakeholders to produce solutions that advance environmental protection, economic development, and social equity—in California, nationally, and internationally. We work to change policy and find real-world solutions to problems like water shortages, habitat destruction, global warming, and environmental injustice. Since our founding in 1987, the Pacific Institute has become a locus for independent, innovative thinking that cuts across traditional areas of study, helping us make connections and bring opposing groups together. The result is effective, actionable solutions addressing issues in the fields of freshwater resources, climate change, environmental justice, and globalization. More information about the Institute and our staff, directors, funders, and programs can be found at www.pacinst.org.

This report is available online at no charge at http://www.pacinst.org/reports/co_river_municipal_deliveries/. Also posted at this website is the spreadsheet compiling water use and population data and calculating per capita use rates. The spreadsheet also lists the sources for the data used in this report.

About the Author

Michael Cohen is a senior research associate at the Pacific Institute and is based in Boulder, Colorado. He is the lead author of several Institute reports and the co-author of several journal articles on water and the environment in the border region.

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Executive Summary

The iconic Colorado River supplies water to millions of people in fast-growing cities in the Colorado River's watershed, such as Las Vegas, Mexicali, Phoenix, and St. George, Utah (see Figure ES-1 at the end of the Executive Summary). Tens of millions of people outside the watershed, from Denver to Albuquerque and from Salt Lake City to Los Angeles, San Diego, and Tijuana, also receive water exported from the basin to meet at least some of their residential and commercial water needs. More than half of the people receiving water from the basin live in southern California. In fact, about 70 percent of the people that receive water from the basin do not actually live in the basin. This study reports population and water delivery data and trends for 100 cities and water agencies that use Colorado River basin water, compiling such information for the first time in one location.

These municipal deliveries – which include deliveries to the residential, commercial, industrial, and institutional sectors, as well as some landscape irrigation, but do not include deliveries to agriculture, energy producers, or mining – comprise only about 15 percent of total Colorado River use (agriculture uses more than 70 percent). However, municipal deliveries are the fastest-growing sector, driving demands for additional water supplies, placing pressure on a river system that is over-allocated and facing a supply-demand imbalance, as well as the prospect of long-term declines in run-off due to climate change.

The number of people relying at least in part on water from the Colorado River basin increased by roughly 10 million people from 1990 to 2008, to a total of almost 35 million. Much of this increase occurred in areas experiencing extraordinary population growth: several cities in Arizona and Utah more than tripled in population between 1990 and 2008. The Las Vegas metropolitan area added upwards of a million people, more than doubling in size. Tijuana also roughly doubled in size, adding more than 800,000 people reliant on Colorado River water for an estimated 90 percent of their water supply.

Total water deliveries by these 100 agencies increased from about 6.1 million acre-feet in 1990 to about 6.7 million acre-feet in 2008. The volume of Colorado River basin water deliveries by these agencies also increased by about 0.6 million acre-feet over this period, from 2.8 million acre-feet to 3.4 million acre-feet, rising from 46 percent to 51 percent of total deliveries. The agencies delivering water in southern California actually delivered four percent less water in 2008 than they had in 1990, despite delivering water to almost 3.6 million more people. In fact, 28 water agencies in five different states delivered less water in 2008 than they had in 1990, despite population growth in their service areas.

Almost every one of the water agencies included in the study experienced declines in per capita deliveries from 1990 to 2008. People and business are demanding less water than they did in 1990. This report does not attempt to determine the causes of these declines, but it does quantify these changes over time, giving a picture of trends for municipal water providers. The majority of people receiving water from the Colorado River basin live in areas where per capita deliveries dropped an average of at least one percent per year from 1990 to 2008, generating substantial long-term declines. Many of these areas showed substantial reductions in per capita deliveries

from delivery rates that were already much lower than average for the 100 agencies; it was not just the high per-capita-use agencies that demonstrated large reductions in per capita deliveries. Because of these substantial per capita declines, municipal water deliveries were roughly two million acre-feet lower than they would have been had per capita deliveries remained constant from 1990 to 2008.

Nine agencies' per capita deliveries actually increased from 1990 to 2008, though these agencies provide water to only about two percent of the total population receiving water from the basin. If the water agencies in this study had all experienced per capita declines of at least one percent, total deliveries would have increased by about 300,000 acre-feet, only half as much as the actual increase in municipal deliveries by these agencies. While small in comparison with the two million acre-foot reduction already achieved, 300,000 acre-feet is still a sizeable volume of deliveries that could have been avoided if the agencies with less than one percent average annual per capita reductions had been more efficient.

Total municipal water deliveries by agencies delivering water from the Colorado River basin increased by more than 600,000 acre-feet between 1990 and 2008, taking water from a basin that faces a future challenged by diminished supply and continued population growth. Yet the water delivery trends of many of these water agencies offer a route forward, where growth can be accommodated within existing supplies and total demands on the basin actually decline over time. The large number of water agencies from many parts of the Colorado River basin states and Mexico that have already achieved substantial declines in per capita deliveries demonstrate what increased water efficiency and conservation can accomplish and should encourage the less successful agencies to promote conservation and efficiency more aggressively in their own service areas.

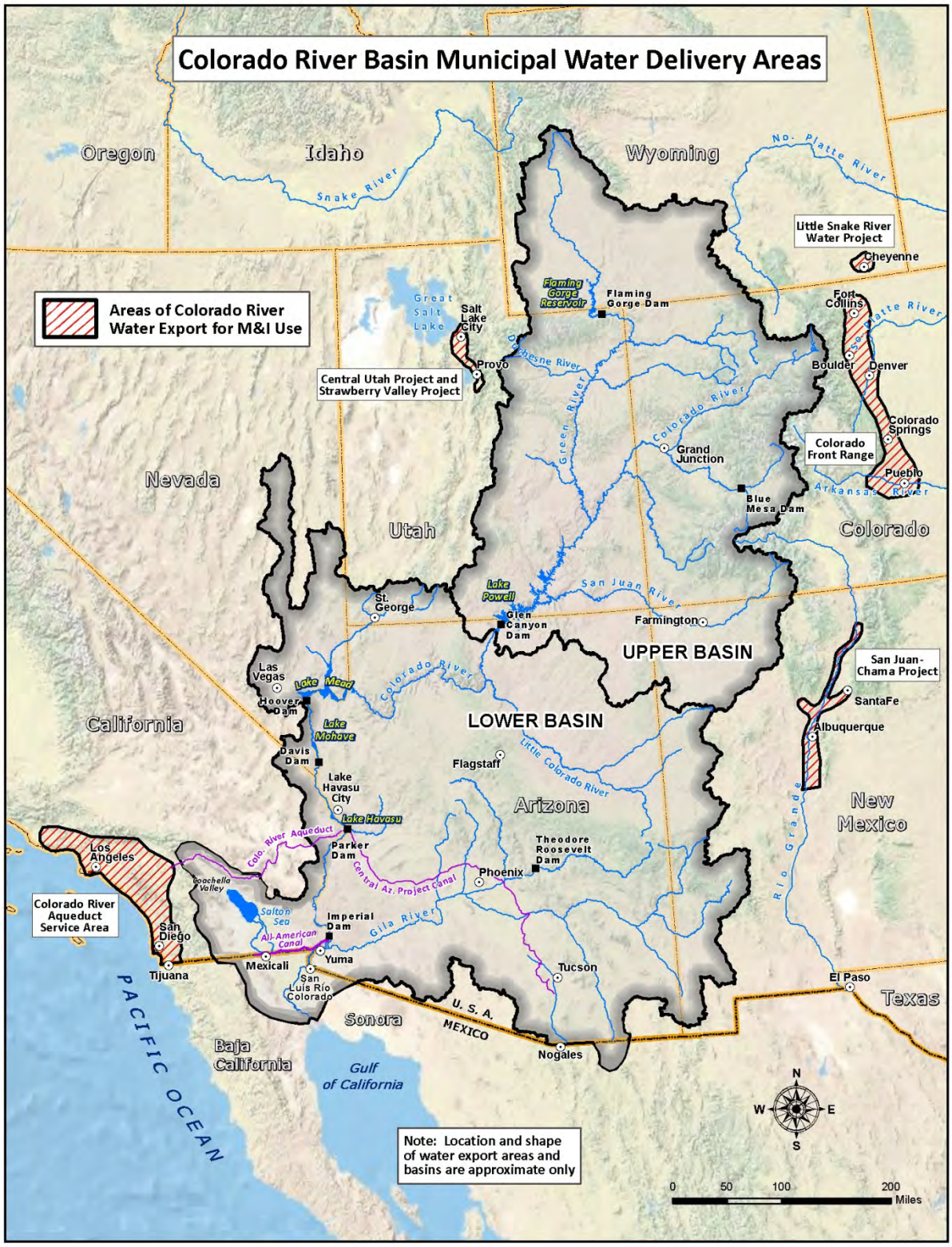

Figure ES-1. The Colorado River Basin and Service Areas of Agencies Delivering Colorado River water[1]