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Ed Warner, Area Manager
Bureau of Reclamation
445 West Gunnison Ave, Suite 221
Grand Junction, CO 81501

Sent via eMail: paradoxeis@usbr.gov

Re: Comments on Draft Environmental Impact Statement for the Salinity Control Program at Paradox Valley, Colorado

Dear Mr. Warner,

1. Introduction

The following non-profit organizations present this letter to you and your colleagues in regards to the Paradox Valley Unit of the Colorado River Basin Salinity Control Program Draft Environmental Impact Statement (PVU DEIS): Living Rivers & Colorado Riverkeeper, Upper Green River Network, Green River Action Network, Las Vegas Water Defender and Canyonlands Watershed Council. Collectively, we are stakeholders of the Colorado River Basin. Most of our organizations are linked by a mutual affiliation to the Waterkeeper Alliance, an international movement of water activists.

Living Rivers is based in the community of Moab, Utah. We live, work and play above the salty rock layer known as the Paradox Formation. It is understood that we have experienced earthquakes resultant to the operations of a deep-injection well at the location of the Paradox

Valley Salinity Control Program near the Utah/Colorado state line.[1] We also understand the severity of the salinity problem. For example, when we do river trips in late summer, we can actually smell and taste the salt while traversing through the splash of whitewater waves, above and below the mouth of the Dolores River. We also acknowledge that this is a problem that needs an enduring basin-wide solution.

This comment letter will have two parts: (1) background and historical perspective; (2) a specific comments on the PVU DEIS. We will provide thoughtful comments for your consideration for initiating short-term goals of the Colorado River Basin Salinity Program, and will conclude that what the Salinity Control Program actually needs is a basin-wide programmatic EIS. The basin needs this information to approach the international community for a planetary climate agreement. This information will be respected by the international community, because it is well-known fact that the Colorado River Basin is the ultimate, international case study for the present maladies that afflict every water management paradigm on six continents. This study should be independent of the current review process for 2007 Interim Guidelines, which will begin in early 2020 with a deadline of December 2025, as announced by Secretary Bernhardt on the 13th of December, 2019.[2] The appropriate first-step in developing a basin-wide programatic EIS should be to reach out to the National Academy of Sciences for help in developing the outline for this study, and to assist in the peer-review of the first and final drafts.

2. Background

As written, the Salinity Control Act (Public Law 93-320) will not solve this basin-wide salinity problem in our lifetime.[3] Moreover, the threat of litigation that this law is designed to avert, will eventually occur. The litigation will likely come from a sovereign state, a sovereign nation, a county, a municipality, or even from rural and urban citizens, such as ourselves.

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[1] News feature by *Moab Sun News*: http://www.livingrivers.org/pdfs/Press/AgingInfrastructureAffectingDoloresRiverCausingQuakesThreatsToWater.pdf

[2] U.S. Department of the Interior. Dec. 13, 2019. Press Release. Following Year of Historic Progress in Colorado River Basin Interior Secretary Bernhardt Encourages Continued Cooperation to Protect Water Users and Environment. Available at: https://www.doi.gov/pressreleases/following-year-historic-progress-colorado-river-basin-interior-secretary-bernhardt

[3] The Salinity Control Act (1974). Available at: http://www.onthecolorado.com/Resources/LawOfTheRiver/SalinityControl1974.pdf

The present constructs of this program will never be sufficient to mediate this problem long-term. This is because human consumption has surpassed the natural supply of the Colorado River and because the trend of rising atmospheric and oceanic temperatures has been persistent. Consequently, the ability to store four-years of water in the "system" has been reduced to two-years. Today, the river water that plunges into Lakes Powell and Mead nearly equals the flow that leaves the reservoirs. In the last 100-years, the system's annual average yield dropped 3 million acre-feet, despite the wetter episodes of the 1980s and 1990s. The temporary gift of increased flows and dilution during that extraordinarily wet time is what actually relieved the pressing salinity problem that occurred in the 1970s, even before the injection well at Paradox Valley became operational and before the completion of the Yuma Desalination Plant.

The deep, underground injection of briny groundwater near Bedrock, Colorado, is a program that had an effective lifespan of only 20-years, and a potentially dangerous geophysical outcome. This is not comforting when considering the increasing vulnerabilities that await 40 million people and countless sensitive species of the basin's aquatic and riparian habitats. The preceding trend of losing 30,000 acre-feet per year due to increased temperatures will not relent in the 21st century—it will likely double to 60,000 acre-feet per year.[4] The model run of Colorado River Simulation System for Trace 21 published in Final Environmental Impact Statement of the 2007 Interim Guidelines indicates that hydropower production in the basin will likely cease for long episodes.[5,6] Trace 21 was also simulated as an exercise in a planning scenario for the 2012 Basin Study.[7] These scenario planning simulations are important because it is hydropower revenues that pay the expenses for the Salinity Control Program and the programs for the recovery of endangered species.

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[4] Udall and Overpeck, 2017. The 21st Century Colorado River Hot Drought and Implications for the Future. Available at: http://www.riversimulator.org/Resources/ClimateDocs/21CenturyColoradoRiverHotDroughtImplicationsForFuture2017Udall.pdf

[5] Graphs of Trace 21. Mead Powell 2007 FEIS. Chapter 4. Available at: http://www.riversimulator.org/Resources/Graphs/TracesNo.1.21.48MeadPowell2007FEISChap4.pdf

[6] Barnett and Pierce, 2008. When will Lake Mead go dry? Available at http://www.riversimulator.org/Resources/ClimateDocs/2008BarnettPierce.pdf

[7] Bureau of Reclamation. 2010. Colorado River Water Supply & Demand Study Draft. Available at: http://www.riversimulator.org/Resources/USBR/BasinStudy/Trace21/Trace21CPScenarioV2.pdf

The other lesson learned from the freshets that occurred in the 1980s is that the basin's flood control policy is wholly inadequate. The five-month snow melt volume of 1983 was about 15 million acre-feet. The conversations that occurred during the Basin Study of 2012 informed us that snow melt volumes of 50 million acre-feet may occur in the future.[8] Paleoflood hydrology research in the Colorado River Basin (CRB), and the Salton Through, tell us that high magnitude floods happened during the Medieval Warming Period, during the Little Ice Age Period, and even when ocean temperatures were stable. This indicates that the basin's water infrastructure is not prepared for any climate regime. The paleoflood hydrology study performed in the watershed of the Dolores River in 2010 informs us that flood control protocols at McPhee Dam will someday be seriously challenged, much like the incident of Oroville Dam in February of 2017.[9] Events of this magnitude could compromise Reclamation's infrastructure on the floodplain of the Dolores River at the Paradox Valley facilities for salinity control.

The performance of the El Nino Southern Oscillation has been seriously compromised in the CRB since 1997. This dysfunction in global circulation patterns is attributed to increasing temperatures of the oceans and the atmosphere, over time. Solving the salinity problem in the CRB includes solving the problem of global circulation patterns, which means reducing greenhouse gas emissions, as quickly as possible.[10] Thus, this is an international problem and not a regional problem. The states of the CRB and the federal government are not responsive toward developing an international movement to reduce greenhouse gas emissions at a planetary scale. This critical pro-active consideration is also lacking at every level in the Cabinet of the United States.

3. The missteps that lead to our current problems with salinity in the Colorado River Basin

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[8] Colorado River Commission of Nevada: http://www.riversimulator.org/Resources/Testimony/Segerblom/2017/ColoradoRiverCommissionNevadaHarkin2017.pdf

[9]Cline, M.L. (2010). Extreme Flooding in the Dolores River Basin, Colorado and Utah: Insights from Paleofloods, Geochronology and Hydroclimatic Analysis. The University of Arizona. Available at:http://www.riversimulator.org/Resources/Hydrology/DoloresRiverPaleofloodStudy2010Cline.pdf

[10] Stationarity is Dead: Whither water management; Milly et al., 2008. http://www.riversimulator.org/Resources/ClimateDocs/MillyBetancourt2008.pdf

The salinity problem is a systematic failure of an inherited planning process beginning in 1902 with Congressional passage of the Reclamation Act. The way we understand the Salinity Control Program is best expressed by a quote from Professor Donald Worster:

> "As the irrigation system approaches maximum efficiency, as rivers get moved around with more and more thorough, consummate skill, the system begins to grow increasingly vulnerable, subject to a thousand ills that eventually bring about its decline. Despite all efforts to save the system, it breaks down here, then there, then everywhere."[11]

The decision to allow trans-basin diversions of pristine water at the stony headwaters of the Colorado River and its tributaries was the first misstep in the CRB planning process for water resource management. In this case, a trans-basin diversion means Colorado River water is intentionally diverted into the watersheds of the Mississippi River and the Rio Grande. This pristine water is better served downstream to dilute the salt and heavy metal pollution that occurs once the main stem and tributaries of the Colorado River encounter the marine, sedimentary rock layers of the Colorado Plateau Province. Additional trans-basin diversions continue from the middle and lower reaches of the Colorado River, and are intentionally diverted into the Great Basin Province and the coastal plain of Southern California. All these diversions serve to aggravate the salinity problem in the basin.

The second misstep was allowing irrigation waste water in the Basin and Range Province to fill an artificial, terminal lake below sea level at the Salton Through. Not only did this sump, also known as the Salton Sea, create a false habitat of ever-increasing salt, heavy metals and toxic industrial chemicals for wildlife to ingest, it has also created a serious air pollution problem for nearby residents that breath the fugitive dust, which emanates from the margins of this stagnant sump during the windy days.[12]

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[11] Worster, D. (1993). The wealth of nature: Environmental history and the ecological imagination. New York: Oxford University Press.

[12] Desert Sun news feature: https://www.desertsun.com/story/news/environment/2019/10/22/imperial-county-declares-salton-sea-emergency-demands-california-take-action/4064788002/

Additionally, in the case of the nearby Welton-Mohawk Irrigation and Drainage District, the salty wastewater sump is the closed aquifer beneath the fields. Like the Paradox Valley Unit, this groundwater is captured by electric pumps and transferred to a conveyance system that terminates in Mexico, which incidentally created a wetland habitat for sensitive wildlife that includes threatened and endangered species. The intended treatment of this saline water is a desalination plant in the floodplain near the Gila/Colorado confluence, which was built to completion and then quickly damaged by floodwaters. This facility is largely non-operational for reasons of insufficient funding. A choice to make this desalination plant fully operational means the artificial wetland, now helpful to a wildlife community, would be sacrificed.[13]

The third misstep was overbuilding the CRB's storage capacity with facilities located in the hottest deserts of North America. Approximately 11 million acre-feet of flow per year has been stalled in these reservoirs for a time-period of about four-years, which then evaporates about 1.5 to 2 million acre-feet each year, which cumulatively increases salinity levels in the water column of each reservoir. That four years of stall is now two-years and soon it will be one-year, and eventually the system will operate as it did before the fulfillment of the Boulder Canyon Project Act. We then will have moved to a flow regime known as "run of the river." When that situation arrives the flowing river will remobilize all the stored sediment contained in the reservoirs, which includes elements that will damage water quality for dependent wildlife and people. Northcutt Ely, Walter B. Langbein and Luna B. Leopold are a few of the individuals who alerted the states and Reclamation to the problem of building redundant reservoir infrastructure.[14,15,16] They warned of escalating evaporation and diminishing return on investment.

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[13] Cronkite News feature: https://cronkitenews.azpbs.org/2018/05/02/yuma-plant-meant-to-conserve-water-will-cost-millions-to-update/

[14] Light on the Mexican Water Treaty. http://www.riversimulator.org/Resources/LawOfTheRiver/LightMexicanTreatyElyCRWUA1946.pdf

[15] Water Yield and Reservoir Storage in the United States. http://www.riversimulator.org/Resources/Hydrology/WaterYieldAndReservoirStorageUSA1959Langbein.pdf

[16] Probability Analysis Applied to a Water-Supply Problem. http://www.riversimulator.org/Resources/USGS/Leopold1959.pdf

Permitting the Dolores River Project, a large scale inter-basin water transfer, that facilitates irrigation of the saline soils of the San Juan River Basin, was the fourth misstep. Permitting this project was counter to to mitigating salt inputs at the Paradox Valley Unit. It must also be appreciated that saline springs are not isolated to just the Dolores River. They are abundant and scattered wherever the river and tributaries have contact with the Paradox Formation.

The fifth misstep was full enforcement of maximizing human consumption for the sole-purpose of dominating the natural wealth of Colorado River Basin, which is an impossible mandate to achieve because the overarching goal of nature is to share and optimize that wealth with all living communities. The current water management scheme works against laws of nature and, in time, will be forcefully corrected. There is no question that this "Cadillac Desert" is headed to the junkyard and there is no time to waste.[17] Reclamation must accept the need and purpose to conduct a basin-wide programmatic Environmental Impact Statement that carries a theme of self-correcting all the system imbalances. This proposed effort should be a time-scaled, multi-generational process beginning immediately to avoid an assured and terminal situation. We think Reclamation already knows what to do and we want you to please consider that this process is the only way to truly honor the values of the three C's: collaborate, communicate and cooperate.

4. Additional water should be released from McPhee Dam to mitigate salinity

Reducing the volume of the inter-basin diversion from the Dolores River to the San Juan Basin, and increasing the quantity of water released downstream, would supplement Reclamation's action towards reducing salt loads in Paradox Valley. Reduced flows lead to higher concentrations of salinity in all river systems, which has especially compounded the salinity issue for the Dolores River. Since the construction of the Dolores Project, the magnitude, frequency, and duration of spring peak flows have decreased by 30% before McPhee Dam was

[17] Sabo, J.L. et al. (2010). Reclaiming Freshwater Stability in the Cadillac Desert. PNAS. Available at: .http://www.riversimulator.org/Resources/ClimateDocs/ReclaimingFreshwaterSustainabilityInTheCadillacDesertSabo2010.pdf

constructed to 69% after McPhee was built and in operation.[18] In many ways the Dolores River can be seen as a microcosm of the Colorado River, in that they both have a high-volume of trans- and intra-basin diversions, over-allocated water rights, intense natural variability, presence of Native Americans, and high-quality recreational opportunities.

We understand releasing more water downstream to mitigate salinity is challenging in the over-allocated system, as currently, only 700 acre-feet a year is allocated specifically for the Paradox Valley Unit (PVU). However, Reclamation, as the primary owner and operator of the Dolores Project alongside the Dolores Water Conservancy District (DWCD), has a responsibility to manage the river downstream of McPhee Dam, as well as to the larger Colorado River. We suggest that the efficiency of water used by Dolores Project Full-Service Farmers and Montezuma Valley Irrigation Company (MVIC) be studied by the Reclamation in order to understand how private and federal water systems are functioning. Outcomes from such an exercise may lead to installation of more water-efficient delivery systems (particularly on out-dated MVIC infrastructure) with "saved" water allocated downstream in a manner consistent with a more natural flow regime.

5. Comments on Alternative A: No Action

We prefer Alternative A over B1, B2 and C. No action is better than destroying wild and critical landscapes for short-term salinity mitigation. Project money could be used instead in the Lower Colorado River Basin and in Mexico to improve farming practices and existing salinity control facilities. Improving critical habitat for wildlife is a high-value goal that should never be sacrificed by any alternative.

6. Comments on Alternative B: New Deep Injection Well

We strongly oppose every aspect of Alternative B1 and B2. First, we oppose the construction of the B1 well site within the Dolores River Canyon Wilderness Study Area (WSA) near Wild Steer

[18] Core Science Report for the Dolores River Dialogue, 2005. Available at: http://ocs.fortlewis.edu/drd/pdf/coreScienceReport.pdf

Canyon. The wilderness qualities of this area are unmatched and need to be protected at all costs, which explicitly includes not allowing machinery or development occur. Benefits of this area include world-class rafting recreational opportunities, wildlife and fish habitat, and myriad cultural sites. Secondly, the construction of roads and bridges would also decrease water quality by increasing sedimentation and other chemicals, and disturb high-quality animal habitat such as bighorn sheep. Page 3-34 of the draft EIS states that: "the Dolores River, Wild Steer Canyon, La Sal Creek, West Paradox Creek, along with the associated riparian corridors and agricultural fields, offer the most suitable habitat for waterfowl and shorebirds in the area." As the EIS postulates, it is important to maintain the integrity of the riverside area along the Dolores and the stated tributaries for bird habitat. Thirdly, deep-injection wells have clearly shown to cause seismic activity, which may cause immense damage to the river corridor, wildlife, and local residents. We understand that another well, even in a different layer, would subsequently cause earthquake activities in years to come.

7. Comments on Alternative C: Evaporation Ponds

We are concerned about impacts to birds, elk, mule deer, water resources, and landowners stemming from actions in Alternative C. Given the entire project area is 600-acres, actions would impair critical habitat for elk and mule deer habitat, which would be disturbed with increased activity and the presence of evaporation ponds. The study area sits on top of the ephemeral East Paradox Creek, prone to flashy and unpredictable conditions. The currently-inactive USGS gage has records of floods of almost 400 cfs[19] times, which could potentially flood the site and carry salt directly into the Dolores River. Finally, landowners in the area may find issue with the aesthetics of the ponds, as well as their impacts to big game, in which many land owners rely on private hunting tags to supplement income.

8. Comments on Alternative D: Zero Liquid Discharge Technology

We are open to considering Alternative D, as it would discharge filtered water into the river, create much needed jobs in the region, especially with the shutdown of Nucla Power Plant. We

[19] https://nwis.waterdata.usgs.gov/usa/nwis/peak/?site_no=09169800

do reiterate the importance of conducting a more in-depth EIS if Alternative D is chosen. Some aspects may need to be improved, however. Constructing solar panels at suitable locations in order to meet high energy requirements is suggested to mitigate any need to develop additional power lines. New natural gas pipelines should not cross the floodplain of the Dolores River in case a flood, leak or spill were ever to occur, in particular with the frequency of seismic activity in the region. Further, it is important that water being discharged into the Dolores River be filtered to an appropriate extent by current WOTUS (Waters of the United States) standards that include ephemeral water bodies and wetlands.

9. Conclusion

We would like to thank the Bureau of Reclamation for conducting public information sessions and providing the opportunity to comment on this important project. We also appreciated that the comment period was extended form February 4 to February 19. We hope Reclamation will consider our request for a programmatic basin-wide EIS, as well as direct comments towards the proposed PVU in Paradox Valley and adopt the no-action Alternative A.

Sincerely yours,

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Living Rivers & Colorado Riverkeeper

Rica Fulton, Program Director
Upper Green River Network

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