PROTEST OF WATER RIGHTS APPLICATION 41-3747 (A81080)
WATER HORSE RESOURCES LLC AND STOEL RIVER LLP

April 4, 2018

Utah Division of Water Rights
P0 Box 146300
Salt Lake City, UT 84114-6300

Re: Protest of Water Rights Application A81080

To the State Engineer:

The Center for Biological Diversity hereby protests 41-3747 (A81080) Water Horse Resources, LLC and Stoel River LLP's application to use 76 CFS / 55,000 AF from the Green River at Browns Park, Utah, for exporting river water to Colorado's Front Range.

The water transfer application, if granted, and subsequent water withdrawals would adversely impact Utah's rivers, communities, economy, agriculture, endangered species, and the region's already perilous water future due to over-allocation of water resources. For those reasons, and because of violations of applicable state and federal law outlined below, the Center requests you to reject the application.

I. PROTESTING PARTY

Center for Biological Diversity
c/o Lisa Belenky, Senior Attorney
Taylor McKinnon, Public Lands Campaigner
1212 Broadway, St. #800
Oakland, CA 94612
lbelenky@biologicaldiversity.org
tmckinnon@biologicaldiversity.org

The Center for Biological Diversity ("Center") is a non-profit environmental organization dedicated to the protection of native species and their habitats through science, policy, and environmental law. The Center has over 61,000 members, including over 450 members living in Utah and the Uintah Basin. The Center's staff and members have visited and intend to continue to visit the Green River for recreational, scientific, educational, spiritual and other pursuits and intend to continue to do so in the future, and are particularly interested in protecting the many native, imperiled, and sensitive species and their habitats, including and especially the Colorado River endangered fish species, that may be affected by the proposed water withdrawal.

II. APPLICATION PROTESTED

The Center for Biological Diversity hereby protests 41-3747 (A81080) Water Horse Resources, LLC and Stoel River LLP's application to use 76 CFS / 55,000 AF from the Green River at Browns Park, Utah, for exporting river water to Colorado's Front Range.

III. REQUEST FOR HEARING

The Center requests that the State Engineer hold a hearing on this application.

IV. REASONS FOR PROTEST

1. BECAUSE THE APPLICATION FAILS TO IDENTIFY THE PLACE, NATURE, PERIOD AND EXTENT OF THE CURRENTLY APPROVED USE, THE APPLICATION VIOLATES UTAH TITLES 73-3-3 AND 73-3a-108 AND MUST BE REJECTED

Application criteria require that applications satisfy Section 73-3-3, 73-3-5.5, or 73-3-8, whichever is applicable. 73-3a-108(1)(i)(A) (criteria for evaluating water export applications). Section 73-3-3(4)(vii), applicable to the proposed permanent change applied for here, requires that the application "shall include" "the place, nature, period, and extent of the currently approved use." Because it lacks any information about the place, nature, period, and extent of any currently approved use, application 41-3747 (A81080) fails to meet criteria of 73-3a-108(1) and therefore "shall be rejected." 73-3a-108(3). This failure is aggravated by the fact that the application is predicated on using part of the State of Colorado's apportionment under the Upper Colorado River Compact, but applicants provide no evidence demonstrating that the State of Colorado has agreed to yield or otherwise transfer its apportionment. Absent such concurrence, the application is disconnected from any currently approved use.

2. BECAUSE THE APPLICATION FAILS TO IDENTIFY THE PLACE, NATURE, PREIOD AND EXTENT OF THE PROPOSED USE, THE APPLICATION VIOLATES UTAH TITLES 73-3-3 AND 73-3a-108 AND MUST BE REJECTED

In addition, Section 73-3-3(4)(viii), requires that the application "shall include" "the place, nature, period, and extent of the proposed use." Application 41-3747 (A81080) fails to describe the place, nature, period, and extent of the proposed water use. It provides only disjointed, incoherent and incomplete information relating to potential water uses and potential places where, presumably, water might be used. Application at 2 and 17-62. It fails to identify any specific municipalities, domestic users, farms, mines, livestock operators, power plants, commercial industrial or other proposed water uses or users; it includes no information about the locations at which those hypothetical uses might occur; it includes no information about the purpose of extent of those hypothetical uses.

Because the application fails to describe with any specificity the nature, period, and extent of proposed water uses for any particular places, application 41-3747 (A81080) fails the criteria of 73-3a-108 and 73-3-3(4)(viii). That same lack of specific information starves the State Engineer of any evidence necessary to find that water can be "beneficially used in the recipient state," which also fails criteria of 73-3a-108 and 73-3a-108(1)(b)(ii). Both foregoing failures require that the application "shall be rejected." 73-3a-108(3).

3. GIVEN REASONABLY ANTICIPATED WATER SHORTAGES, THE WATER RIGHT TRANSFER APPLICATION CONTRADICTS REASONABLE WATER CONSERVATION OBJECTIVES AND THE PUBLIC WELFARE, VIOLATING UTAH TITLE 73-3a-108; THE APPLICATION THEREFORE MUST BE REJECTED

A. The proposed water export will undermine Utah's policy goals.

Concerning water exports Utah's policy states:

To ensure the welfare of its citizens, the state of Utah is dedicated to:
(a) the conservation of its scarce water resources;
(b) providing adequate water supplies;
(c) ensuring that the waters of the state's streams are available to meet the state's water requirements; and
(d) controlling its water resources in a manner that is in the best interest of the public.

Utah Code 73-3a-101. As detailed below, the proposed water transfer would undermine water conservation efforts, impair provision of adequate water supplies in the future to meet the state's requirements and therefore it is not in the best interest of the public.

B. Water shortages in the Green River and Colorado River are reasonably anticipated

Peer-reviewed scientific literature pertaining to Colorado River flows, summarized below, establishes that water shortages in the Upper Colorado River Basin, including the Green River, are reasonably anticipated by the preponderance of modern peer-reviewed science.

Rising temperatures

The Colorado River basin has warmed significantly during the past century, with average increases in surface temperature of 1.6°F (0.9°C) over the Southwest during 1901-2010 (Hoerling et al. 2013). The greatest warming has occurred in spring and summer, and in daytime high temperatures and nighttime low temperatures (Bonfils et al. 2008, Hoerling et al. 2013). Surface temperatures in the Southwest are projected to increase steeply in this century by an average of 4.5 to 7.9° F depending on the emissions scenario, with an average of 2.5 to 3°F of warming projected for 2021-2050 alone (Cayan et al. 2013). As explained below, warming temperatures are having significant effects on streamflow, drought severity, and the hydrologic cycle in the Southwest (Barnett et al. 2008, Woodhouse et al. 2016). And more recently, Udall and Overpeck (2017) found that between 2000 and 2014, annual Colorado River flows averaged 19% below the 1906 to 1999 average, which made that period the worst 15-year drought on record. The flow reductions are driven primarily by an increase in temperatures rather than a decrease in precipitation. Temperature-induced declines in river flow could reach from 35 to 55% by the end of the century (Udall and Overpeck 2017).

Earlier snowmelt and streamflow

In much of the Colorado River basin, snowmelt, snowmelt runoff, and streamflow timing have trended earlier since the mid-1950s, in parallel with warming temperatures (Hamlet et al. 2005, Stewart et al. 2005, Barnett et al. 2008, Hoerling et al. 2013, Garfin et al. 2014). The Colorado River basin's spring pulse from 1978-2004 shifted to two weeks earlier compared to flows before 1978 (Ray et al. 2008). Although there are both natural and human influences on these hydrologic trends, studies

indicate that anthropogenic greenhouse gases began to impact snow-fed streamflow timing during 1950-1999 (Barnett et al. 2008, Hidalgo et al. 2009, Hoerling et al. 2013). Modeling studies have projected that snowmelt, spring runoff, and streamflow timing will continue to shift earlier across much of the Southwest (Stewart et al. 2004, Rauscher et al. 2008, Dettinger et al. 2015).

Decreasing snowpack

The Colorado River receives most of its water from winter snowpack from the Rocky Mountains, where 15% of the total basin areas generates 85% of the river flow (Dettinger et al. 2015). Across much of the Colorado River basin, the spring snowpack is decreasing and more winter precipitation is falling as rain instead of snow (Hamlet et al. 2005, Pierce et al. 2008, Das et al. 2009). Approximately half of the observed decline in snowpack in the western United States during 1950-1999 has been attributed to the effects of anthropogenic greenhouse gases, ozone and aerosols (Pierce et al. 2008). Modeling studies project a continued reduction of Southwest mountain snowpack during February through May during this century, largely due to the effects of rising temperatures (Cayan et al. 2013, Dettinger et al. 2015).[1]

Declining Runoff and Streamflow

Annual runoff in the Colorado River basin appears to be declining (USBR 2011), with significant consequences for reduced streamflow. During 2001–2010, warm temperatures and dry conditions reduced average naturalized flows in the Colorado River (measured at Lees Ferry) to the second-lowest-flow decade since 1901, to12.6 million acre-feet per year compared to the 1901–2000 average of 15.0 million acre-feet per year (Hoerling et al. 2013).

Modeling studies project that runoff and streamflow will continue to decrease substantially in the Colorado River basin during this century (Ray et al. 2008, Das et al. 2011, USBR 2011, Cayan et al. 2013, Georgakakos et al. 2014, Dettinger et al. 2015). Barnett and Pierce (2009) concluded that anthropogenic climate change is likely to reduce runoff in the Colorado River basin by 10-30% by 2050. Projected reductions in runoff range from 6-7% (Christensen and Lettenmaier 2007) to 45% (Hoerling and Eischeid 2007) depending on the models and methods used in each study (see Barnett and Pierce 2009 at Table 2). In the short term, Hoerling and Eischeid (2007) predict streamflow to decrease by 25% during 2006-2030, and by 45% during 2035-2060.

Importantly, numerous studies show that warming temperatures alone will cause runoff and streamflow declines in the Colorado River basin. For example, in a recent review, Vano et al. (2014) estimated that future streamflow in the Colorado River basin will be reduced by 5% to 35% due to

[1] Currently, snowpack is below average in much of the Colorado River basin. *See, e.g.,* "Scarce Rocky Mountain Snowpack Deepens Southwest Water Supply Concerns." All Things Considered. Luke Runyon. Mar 13, 2018. KUNC http://www.kunc.org/post/scarce-rocky-mountain-snowpack-deepens-southwest-water-supply-concerns (explaining that snowpack in the Upper Colorado River Basin currently at only 69 percent of median).

rising temperature alone. When precipitation change is considered, a 5% decrease in precipitation would further reduce streamflow by 10% to 15% (Vano et al. 2014). Similarly, Barnett and Peirce found human-induced climate change will decrease flow on the Colorado River by from 10 to 30% over the next fifty years (Barnett and Peirce 2009). If it is 20%, scheduled deliveries will be missed in 88% of the years by 2050 (Barnett and Peirce 2009).

Moreover, warming temperatures will play an increasingly important role in causing runoff to decline in the Colorado River basin, and must be factored into streamflow forecasts (Woodhouse et al. 2016). An empirical study of the influence of precipitation, temperature, and soil moisture on upper Colorado River basin streamflow over the past century found that warmer temperatures have already resulted in flows less than expected based on precipitation levels (Woodhouse et al. 2016). Consistent with past research, the study found that cool season precipitation explains most of the variability in annual streamflow. However, temperature was highly influential in determining streamflow under certain conditions. The study concluded that "[s]ince 1988, a marked increase in the frequency of warm years with lower flows than expected, given precipitation, suggests continued warming temperatures will be an increasingly important influence in reducing future UCRB water supplies." The researchers warned that "streamflow forecasts run the risk of overprediction if warming spring and early summer temperatures are not adequately considered."

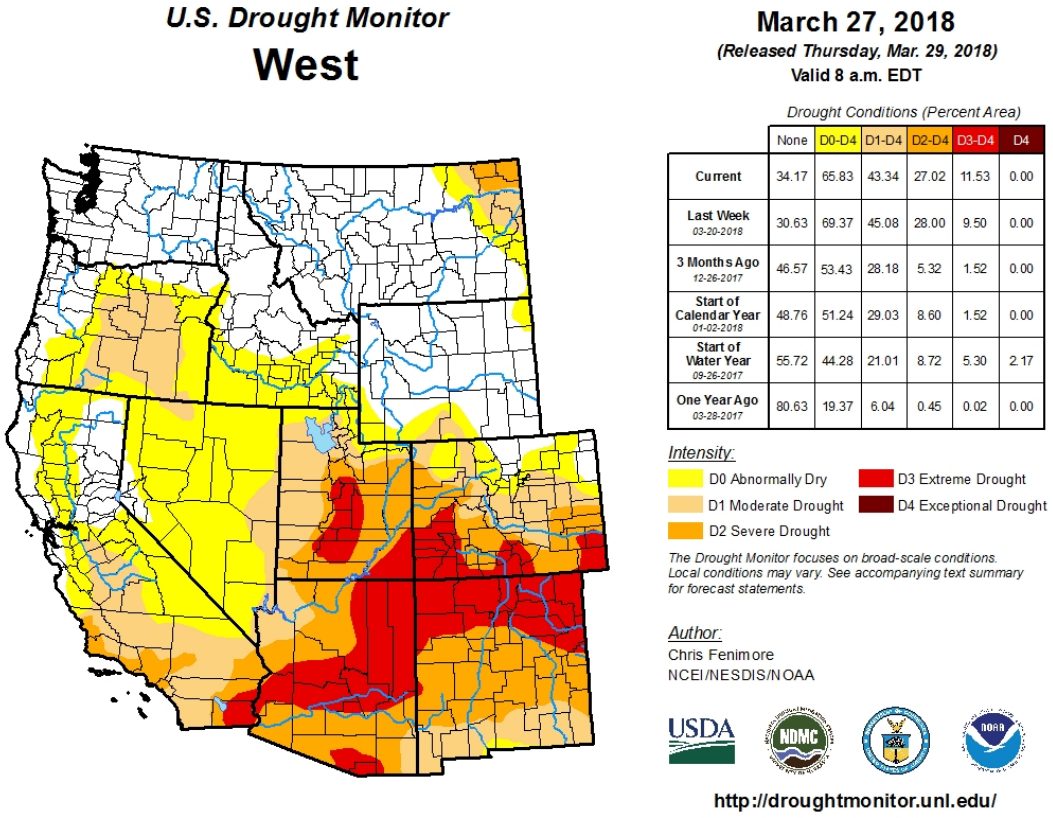
Increasing Drought Severity

Historically, droughts in the Colorado River basin were primarily driven by precipitation deficits. However, studies indicate that rising temperatures have begun to play a more important role in driving droughts (Hoerling et al. 2013, Vano et al. 2014). Importantly, rising temperature superimposed on natural drought variability is expected to exacerbate the impacts of droughts (Seager et al. 2012, Cook et al. 2015). Modeling studies project that droughts in Southwest will intensify due to longer periods of dry weather and more extreme heat, leading to higher evapotranspiration and moisture loss (Seager et al. 2007, Cayan et al. 2010, Trenberth et al. 2013). In the Colorado River basin, future droughts are projected to be substantially hotter, and drought is projected to become more frequent, intense, and longer lasting than in the historical record (Garfin et al. 2014).

Reduced reservoir levels and unsustainable demand for water

Of the more than 90 reservoirs on the river and its tributaries, the two largest are Lake Mead and Lake Powell which together can store up to 85% of the total flow for the basin combined (Christensen et al. 2004). Reservoirs in the Colorado River basin are highly vulnerable to climate change, particularly because the amount of storage in reservoirs is sensitive to runoff changes (Barnett and Pierce 2008). Even small decreases in runoff have caused average reservoir levels to markedly decrease (Christensen et al. 2004). Christensen et al. (2004) predicted that climate change impacts on the hydrology of the Colorado River system would result in water demand (deliveries and evaporation) exceeding reservoir inflows (which would also be decreased), resulting in a degraded system. Likewise, Barnett and Pierce (2008) projected that a 10% reduction in runoff would result in requested water deliveries surpassing sustainable deliveries by 2040, while a 20%

reduction in runoff would cause unsustainable water demands by 2025. A greater demand than supply makes the system more prone to long-term sustained droughts, as reservoirs will not have sufficient time to be naturally replenished and more water will be extracted from a dwindling supply than is sustainable (Christensen and Lettenmaier 2007). Reservoirs would spend additional time in a depleted state, weakening the system's buffering ability in years where there is low precipitation (Barnett and Pierce 2009). And currently, area remains subject to persistent drought and multiple dry years on an ongoing basis which puts even greater demands on existing and future water supplies. The most recent with recent data shows extreme, severe, and moderate drought dominate throughout the region.[2]



C. Reasonably anticipated water shortages render application approval inconsistent with Utah's reasonable water conservation policies or objectives and contrary to the public welfare.

In reviewing the criteria in 73-3a-108(1)(b)(i)(B) and (1)(b)(i)(C), including whether the application is consistent with reasonable water conservation policies or objectives and consistent with the public welfare, the state engineer "shall consider" whether "there are current or reasonably anticipated water shortages within Utah." 73-3a-108(2)(c). Because the preponderance of scientific evidence demonstrates that "there are current or reasonably anticipated water shortages within Utah," application 41-3747

[2] http://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?West visited March 29, 2018.

(A81080) fails to meet criteria of 73-3a-108(1) and therefore "shall be rejected." 73-3a-108(3).

4. BECAUSE UTAH'S APPORTIONMENT OF THE UPPER COLORADO RIVER COMPACT IS ENTIRELY OR OVER-ALLOCATED, THE WATER RIGHT TRANSFER APPLICATION CONTRADICTS REASONABLE WATER CONSERVATION OBJECTIVES AND THE PUBLIC WELFARE, VIOLATING UTAH TITLE 73-3a-108; THE APPLICATION THEREFORE MUST BE REJECTED

As explained above, Utah's policy concerning water exports states:

> To ensure the welfare of its citizens, the state of Utah is dedicated to:
> (a) the conservation of its scarce water resources;
> (b) providing adequate water supplies;
> (c) ensuring that the waters of the state's streams are available to meet the state's water requirements; and
> (d) controlling its water resources in a manner that is in the best interest of the public.

Utah Code 73-3a-101.
Utah's apportionment of the Upper Colorado River Compact is 1.369 million acre-feet. According to information from Utah Department of Water Resources, current uses account for 1.008 million AF of that apportionment and future applications will appropriate at least 341,000 acre feet, leaving a balance of not more than 20,000 acre feet.[3] In their protest of the application, Utah Board of Water Resources and Utah Division of Water Resources state that Utah's entire Upper Basin Compact apportionment is "already developed or covered by applications to appropriate in Utah," further noting that, "even if Colorado authorizes the withdrawal as part of its allocation, there is no assurance in the application that Colorado agrees to comply with Utah's priority system in allocating these shortages." Further, data on Utah DWR's Water Right Diversion / Depletion Priorities website, updated through 2018, indicates depletions of 2,542,091.60 acre feet, suggesting that Utah is at risk of shortages far beyond its 1.369 million apportionment.[4]

For these reasons, granting the water rights application would further exacerbate existing and future water shortages, undermining Utah's water policy goals.

5. APPROVAL OF THE WATER RIGHT TRANSFER APPLICATION WOULD ILLEGALY TAKE ENDANGERED FISH AND UNDERMINE RECOVERY PROGRAM ACTIVITIES IN VIOLATATION OF SECTION 9 OF THE ENDANGERED SPECIES ACT

A. ESA Background Law

Section 9 of the ESA specifically prohibits the "take" of an endangered species, 16 U.S.C. § 1538(a)(1)(B), a term broadly defined to include harassing, harming, pursuing, wounding or killing such species, 16 U.S.C. § 1532(19). The term "harm" is further defined to include "significant habitat modification or degradation where it … injures wildlife by significantly

[3] Protecting the Colorado River for Utah. 2018 Water Users Workshop. Eric Millis, Director, Utah Division of Water Resources.
[4] See: https://www.waterrights.utah.gov/distinfo/colorado/WRPriorityDDview.asp

impairing essential behavioral patterns, including breeding, feeding or sheltering." 50 C.F.R. §17.3 "Harass" includes any "act or omission which creates the likelihood of injury to wildlife by annoying it to such and extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering." Id. The ESA's legislative history supports "the broadest possible" reading of "take." *Babbitt v. Sweet Home Chapter of Communities for a Great Oregon*, 515 U.S. 687, 704-05 (1995). "Take" includes direct as well as indirect harm and need not be purposeful. *Id*. at 704.

The take prohibition applies to any "person," 16 U.S.C. § 1538(a)(1), including state agencies and agents such as the Utah Department of Water Resources and the State Engineer, 16 U.S.C. § 1532(13). The ESA further makes it unlawful for any person, including state agencies, to "cause to be committed" the take of a species. 16 U.S.C. § 1538(g). Violations of Section 9 are enforceable under the ESA's citizen-suit provision. 16 U.S.C. § 1540(g).

Courts have repeatedly held that government regulations and decisions authorizing third parties to engage in harmful actions can constitute an illegal taking under Section 9 of the ESA. *See Strahan v. Coxe*, 127 F.3d 155, 158, 163-64 (1st Cir. 1997), cert. denied, 525 U.S. 830 (1998) (state agency caused takings of the endangered right whale because it "licensed commercial fishing operations to use gillnets and lobster pots in specifically the manner that is likely to result in violation of [the ESA]"); *Defenders of Wildlife v. Administrator, Envtl. Protection Agency*, 882 F.2d 1294, 1300-01 (8th Cir. 1989) (federal agency caused takes of endangered black-footed ferret through its "decision to register pesticides" even though other persons actually distributed or used the pesticides); *Loggerhead Turtle v. City Council of Volusia County*, 148 F.3d 1231, 1253 (11th Cir. 1998) (county's inadequate regulation of beachfront artificial light sources may constitute a taking of turtles in violation of the ESA); *Humane Soc'y of the United States v. Kienzle*, 2017 U.S. Dist. LEXIS 181784, *17 (D.N.M. Nov. 2, 2017) (finding "state licensing scheme" for wildlife trapping "can be a proximate cause of a taking in violation of the ESA"); *Red Wolf Coal. v. N.C. Wildlife Res. Comm'n*, 2014 U.S. Dist. LEXIS 65601, *28 (E.D.N.C. May 13, 2014) (partially enjoining state coyote hunting regulations to protect ESA listed red wolves in recovery areas). Actions by states or subdivisions that result in take can be enjoined. *See United States v. Town of Plymouth,* 6 F.Supp.2d 81, 91 (D.Mass. 1998) (preliminary injunction issued against township which authorized off-road vehicles on a beach that was habitat for threatened piping plovers); *Defenders of Wildlife v. Administrator, Envtl. Protection Agency*, 688 F. Supp. 1334, 1356-1357 (D. Minn. Apr. 11, 1988) *aff'd* 882 F.2d 1294 (1989) (enjoining the EPA from continuing its registration of strychnine until it could do so without illegally taking protected species of wildlife).

The state engineer must address impacts to the ESA listed species in considering this application at this time. The state engineer cannot simply assume that there will be subsequent approvals by federal agencies that will consider take of the affected endangered species and protection of those species through a later ESA section 7 consultation.

The state engineer's approval of the water right application for removing 76 CFS and 55,000 AF of water from the Green River could violate Section 9 of the ESA because the water diversion is likely to, harm, harass, or kill

Colorado pikeminnow, razorback sucker (endangered), humpback chub (endangered) and bonytail chub (endangered) downstream of the proposed diversion in the Green and Colorado Rivers.

B. Water withdrawals from the Green River pursuant to the water rights transfer application would take and jeopardize endangered fish.

Four endangered fish species are dependent on water flows downstream of the proposed diversion site for water export in the Green River and Colorado River. The U.S. Fish and Wildlife Service recognizes the importance of these water resources to ensure survival of these fish, and has found that depletions of water in the Upper Colorado River Basin jeopardize these endangered fish.

For example, in its 2008 Biological Opinion for the Vernal Resource Management Plan, the Fish and Wildlife Service re-asserted its long-standing position that all depletions from the Upper Colorado will jeopardize the continued existence of the four listed fish:

> Water depletions from the Upper Colorado River Basin are a major factor in the decline of the threatened and endangered Colorado River fish. The USFWS determined that any depletion will jeopardize their continued existence and will likely contribute to the destruction or adverse modification of their critical habitat (USDI, Fish and Wildlife Service, Region 6 Memorandum, dated July 8, 1997). However, the Recovery Program was established specifically to offset the negative effects of water depletions to the endangered fish populations, and to act as the Reasonable and Prudent Alternative for these depletions. Actual water depletions will be determined, and Section 7 consultation reinitiated on a project-specific basis. (USFWS (2008) at 113.)

When federal agency actions are at issue, formal consultation with USFWS is required for water depletions because water depletions from any portion of the Upper Colorado River drainage basin above Lake Powell are considered to adversely affect or adversely modify the critical habitat of the four resident endangered fish species, and must be evaluated with regard to the criteria described in the Upper Colorado River Endangered Fish Recovery Program. In addition, significant new information regarding progress under the Recovery Program and climate change effects on Green and Colorado River flows requires careful evaluation of the effects of the water depletions such as the proposed water withdrawals on the four endangered fish.
The USFWS Recovery Program's 2015 Assessment of Sufficient Progress under the Upper Colorado River Endangered Fish Recovery Program indicates that Colorado pikeminnow are in decline and failing to meet recovery goals in the Green River Subbasin that would be affected by the proposed action:

> Data from the third round (2011–2013) of population estimates for the Green River Subbasin are still being analyzed (thus no confidence intervals are shown for the 2011–2013 estimates in Figure 4). Preliminary results from this analysis indicate adults and sub-adults are in decline throughout the entire Green River Subbasin.
> . . .
>
> Another demographic requirement in the 2002 Recovery Goals is that recruitment of age-6, naturally-produced fish must equal or exceed mean annual adult mortality. Estimates of recruitment age fish have

> averaged 1,455 since 2001, but have varied widely (Figure 5). Recruitment exceeded annual adult mortality only during the 2006 – 2008 period. (USFWS(2015) at 7.)

Pikeminnow within the Green River subbasin are also being adversely affected by mercury concentrations, which would be exacerbated by the proposed water withdrawal:

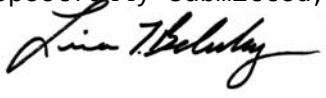
> Although a good portion of the recovery factor criteria (USFWS 2002a) are being addressed, nonnative fish species continue to be problematic and researchers now speculate that mercury may pose a more significant threat to Colorado pikeminnow populations of the upper Colorado River basin than previously recognized. Osmundson and Lusk (2012) recently reported elevated mercury concentrations in Colorado pikeminnow muscle tissue; the highest concentrations were from the largest adults collected from the Green and Colorado river subbasins. Mercury exposure has been reported to impair reproduction in fish (Batchelar et al. 2013; J. Lusk, U.S. Fish and Wildlife Service, personal communication). Laboratory experiments have shown diminished reproduction and endocrine impairment in fish exposed to dietary methyl mercury at environmentally relevant concentrations, with documented effects on production of sex hormones, gonadal development, egg production, spawning behavior, and spawning success. (USFWS (2015) at 10.)

The proposed water diversion and export in the application would further exacerbate these threats to endangered fish and cause take. As a result, if the state engineer were to approve the application and authorize the water rights transfer and withdrawals from the Green River that are reasonably likely to result in prohibited take of endangered fish, the state engineer could be responsible for violations of section 9 the ESA.

6. CONCLUSION

As explained above, the water rights transfer application, if granted, and subsequent water withdrawals would adversely impact Utah's rivers, communities, economy, agriculture, endangered species, and the region's already perilous water future due to over-allocation of water resources. For those reasons, and because of violations of applicable state and federal law explained above, the Center requests you to reject the application.

Respectfully submitted,



Lisa Belenky, Senior Attorney
Taylor McKinnon, Public Lands Campaigner
Center for Biological Diversity
1212 Broadway, St. #800
Oakland, CA 94612
tel: (510) 844.7107
fax: (510) 844.7150
lbelenky@biologicaldiversity.org
tmckinnon@biologicaldiversity.org

Scientific References: (provided in electronic format on disk)

Barnett, T. P., et al. 2008. Human-induced changes in the hydrology of the western United States. Science 319: 1080–1083.

Barnett, T.P. and D.W. Pierce. 2008. When will Lake Mead go dry? Water Resources Research 44: W03201.

Barnett, T.P. and D.W. Pierce. 2009. Sustainable water deliveries from the Colorado River in a changing climate. PNAS 106: 7334-7338.

Bonfils, C., et al. 2008. Detection and attribution of temperature changes in the mountainous western United States. Journal of Climate 21: 6404–6424.

Cayan, D.R., T. Das, D.W. Pierce, T.P. Barnett, M. Tyree, and A. Gershunov. 2010. Future dryness in the southwest US and the hydrology of the early 21st century drought. PNAS 107: 21227-21276.

Cayan, D. et al. 2013. Future climate: projected average. Pages 101–125 in G. Garfin, A. Jardine, R. Merideth, M. Black, and S. LeRoy, editors. Assessment of climate change in the southwest United States: a report prepared for the

National Climate Assessment. A report by the Southwest Climate Alliance. Island Press, Washington, D.C., USA.

Christensen, N.S., Wood, A.W., Voisin, N., Lettenmaier, D.P., and R.N. Palmer. 2004. The effects of climate change on the hydrology and water resources of the Colorado River basin. Climatic change 62: 337-363.

Christensen, N.S. and D.P. Lettenmaier. 2007. A multimodel ensemble approach to assessment of climate change impacts on the hydrology and water resources of the Colorado River basin. Hydrology and Earth System Sciences 11: 417-1434.

Cook, B.I., T.R. Ault, and J.E. Smerdon. 2015. Unprecedented 21st century drought risk in the American Southwest and Central Plains. Sci. Adv. 1: e1400082–e1400082.

Das, T., H. G. Hidalgo, M. D. Dettinger, D. Cayan, D. W. Pierce, C. Bonfils, T. P. Barnett, G. Bala, and A. Mirin. 2009. Structure and detectability of trends in hydrological measures over the western United States. Journal of Climate 10: 871-892.

Das, T., Pierce, D.W., Cayan, D.R., Vano, J.A., and D.P. Lettenmaier. 2011. The importance of warm season warming to western US streamflow changes. Geophysical Research Letters 38(23).

Dettinger, M., B. Udall, and A. Georgakakos. 2015. Western water and climate change. Ecological Applications 25: 2069-2093.

Garfin, G., G. Franco, H. Blanco, A. Comrie, P. Gonzalez, T. Piechota, R. Smyth, and R. Waskom, 2014: Ch. 20: Southwest. Climate Change Impacts in the United States: The Third National Climate Assessment, J. M. Melillo, Terese (T.C.) Richmond, and G. W. Yohe, Eds., U.S. Global Change Research Program, 462-486.

Georgakakos, A., P. Fleming, M. Dettinger, C. Peters-Lidard, T.C. Richmond, K. Reckhow, K. White, and D. Yates. 2014. Water resources. Pages 69–112 in J. M. Melillo, T. C. Richmond, and G. W. Yohe, editors. Climate change impacts in the United States: the third National Climate Assessment. U.S. Global Change Research Program, Washington, D.C., USA.

Hamlet, A., P.W. Mote, M.P. Clark, and D.P. Lettenmaier. 2005. Effects of temperature and precipitation variability on snowpack trends in the western United States. Journal of Climate 18: 4545-4561.

Hidalgo, H. G., T. Das, M. D. Dettinger, D. Cayan, D.W. Pierce, T. P. Barnett, G. Bala, A. Mirin, A.W. Wood, C. Bonfils, B.D. Santer, and T. Nozawa. 2009 Detection and attribution of streamflow timing changes to climate change in the western United States. Journal of Climate 22: 3838-3855.

Hoerling, M. and J. Eischeid. 2007. Past peak water in the Southwest. Southwest Hydrology 35: 18–19.

Hoerling, M. P., M. Dettinger, K. Wolter, J. Lukas, J. Eischeid, R. Nemani, B. Liebmann, and K. E. Kunkel. 2013. Evolving weather and climate conditions of the Southwest United States. Pages 74–100 in G. Garfin, A. Jardine, M. Black, R. Merideth, J. Overpeck, and A. Ray, editors. Assessment of climate change in the Southwest United States: a report prepared for the National Climate Assessment. Island Press, Washington, D.C., USA.

Pierce, D. W., T. P. Barnett, H. G. Hidalgo, T. Das, C. Bonfils, B. D. Santer, G. Bala, M. D. Dettinger, D. Cayan, A. Mirin, A. W. Wood, and T. Nozawa. 2008. Attribution of declining western U.S. snowpack to human effects. Journal of Climate 21: 6425-6444.

Rauscher, S. A., J. S. Pal, N. S. Diffenbaugh, and M. M. Benedetti. 2008. Future changes in snowmelt-driven runoff timing over the western US. Geophysical Research Letters 35: L16703, doi:10.1029/2008GL034424.

Ray, A.J., Barsugli, J.J., Averyt, K.B., Wolter, K., Hoerling, M., Doesken, N. Udall, B. and R.S. Webb. 2008. Climate change in Colorado: a synthesis to support water resources management and adaptation. Report for the Colorado Water Conservation Board. University of Colorado, Boulder.

Seager, R., M. Ting, I. Held, Y. Kushnir, J. Lu, G. Vecchi, H. Huang, N. Harnik, A. Leetmaa, N. Lau, C. LI, J. Velez, and N. Naik. 2007. Model projections of an imminent transition to a more arid climate in southwestern North America. Science 316: 1181-1184.

Seager, R., M. Tang, C. Li, N. Naik, J. Nakamura, and H. Lui. 2012. Projections of declining surface-water availability for the southwestern United States. Nature Climate Change doi:10.1038/NCLIMATE1787.

Stewart, I. T., D. R. Cayan, and M. D. Dettinger. 2004. Changes in snowmelt runoff timing in western North America under a 'Business as Usual' climate change scenario. Climatic Change 62: 217-232.

Trenberth, K.E., A. Dai, G. van der Schrier, P.D. Jones, J. Barichivich, K.R. Briffa, and J. Sheffield. 2013. Global warming and changes in drought. Nature Climate Change 4: 17-22.

Udall, Bradley and Overpeck, Jonathan. The twenty-first century Colorado River hot drought and implications for the future. 2017. 53 (3):2404 Water Resources Research

[USBR] US Bureau of Reclamation and Colorado River Basin Water Supply and Demand Study Team. 2011. Colorado River basin Water Supply and Demand Study: Technical Report B – Water Supply Assessment. Interim Report No. 1.

[USFWS] U.S. Fish and wildlife Service. 2008. Biological Opinion for BLM Resource Management Plan (RMP), Vernal Field Office (VFO)[USFWS] U.S. Fish and Wildlife Service. 2015. Assessment of Sufficient Progress Under the Upper Colorado River Endangered Fish Recovery Program in the Upper Colorado River Basin.

Vano, J. A., Udall, B., Cayan, D. R., Overpeck, J. T., Brekke, L. D., Das, T., Hartmann, H. C., Hidalgo, H. G., Hoerling, M., McCabe, G. J., Morino, K.,

Webb, R. S., Werner, K. & Lettenmaier, D. P. 2014. Understanding uncertainties in future Colorado River streamflow. Bulletin of the American Meteorological Society 95: 59-78.

Woodhouse, C. A., G. T. Pederson, K. Morino, S. A. McAfee, and G. J. McCabe. 2016. Increasing influence of air temperature on upper Colorado River streamflow. Geophys. Res. Lett. 43, doi:10.1002/2015GL067613.