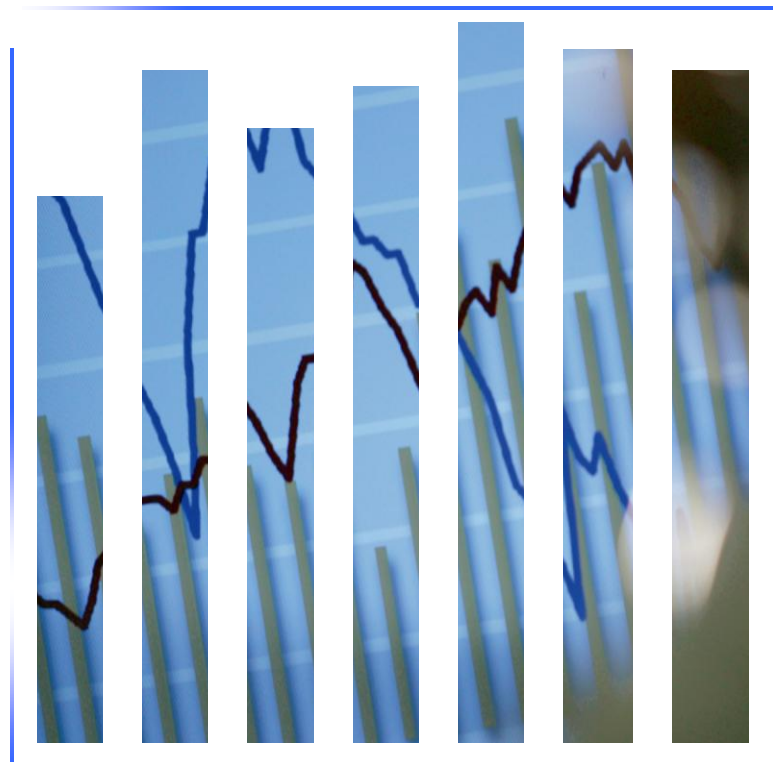


# Review of Opposing Expert Impact Assessment Reports

Water Resource Matter | Nevada Groundwater  
Basins 180, 181, 182 and 184



Prepared for:  
Southern Nevada Water Authority

August 1, 2011



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Submitted by:

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## Introduction

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Applied Analysis ("AA") has been asked by the Southern Nevada Water Authority ("SNWA") to review the expert opinions in the water resource matter before the Nevada State Engineer submitted by Maureen Kilkenny, PhD on June 30, 2011 and Klaus Moeltner, PhD, on November 2, 2006. This report summarizes the salient findings of our review and analysis.

It is important to note at the outset of this review that the foundational assumption in both Kilkenny's and Moeltner's reports is flawed. Both reports operate under the premise that should proposed water withdrawals under the SNWA plan occur, a remarkable level of environmental devastation will occur in White Pine County and Lincoln County, Nevada. Kilkenny's report, in particular, assumes that should the proposed water withdrawals occur, the following industry sectors will be obliterated throughout both counties: agriculture, mining, ranching, farming, forestry, hunting, tourism, recreation, lodging, and restaurants. Clearly, this is not the case as the stated intent of the SNWA, state water laws and federal environmental laws would all prohibit such an outcome from occurring.<sup>1</sup>

Kilkenny's report also operates under the assumption that the economic value of visitor spending as well as the value that individuals derive from the Great Basin National Park, the Swamp Cedar Natural Area, Shoshone Pond Natural Area, Cleve Creek Recreation Area and the Sacramento Pass Recreation Area will be reduced to zero should the proposed water withdrawals occur. Kilkenny expects all visitation to these areas to cease and no further value is expected to be derived from picnicking, camping or engaging in other recreational activity in these areas. However, Kilkenny failed to provide evidence in her report demonstrating that water development in the four underground water basins in question (i.e., Spring (184), Cave (180), Dry Lake (181) and Delamar (182)) will limit visitation to the Great Basin National Park, the Swamp Cedar Natural Area, Shoshone Pond Natural Area, Cleve Creek Recreation Area and the Sacramento Pass Recreation Area. For example, much of the acreage comprising both the Great Basin National Park and the Sacramento Pass Recreation Area is located in mountainous regions outside of the basin boundaries. With regards to the areas that are located within one of the basin boundaries, it is unclear based

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<sup>1</sup> Specifically, refer to Nevada Revised Statutes (NRS) 533.370, *Approval or rejection of application by State Engineer: Conditions; exceptions; considerations; procedure*. Among other applicable sections of NRS 533.370, Section 5 states: "Except as otherwise provided...where there is no unappropriated water in the proposed source of supply, or where its proposed use or change conflicts with existing rights or with protectable interests in existing domestic wells...or threatens to prove detrimental to the public interest, the State Engineer shall reject the application and refuse to issue the requested permit." Additionally, Section 6 states: "In determining whether an application for an interbasin transfer of groundwater must be rejected pursuant to this section, the State Engineer shall consider...Whether the proposed action is environmentally sound as it relates to the basin from which the water is exported...[and] Whether the proposed action is an appropriate long-term use which will not unduly limit the future growth and development in the basin from which the water is exported..." among other factors.

on a review of Kilkenny's report how visitation to the areas is linked to the underground water basins or how the proposed groundwater withdrawals would affect visitation. Even assuming *arguendo* that an unanticipated level of environmental change occurs, the likelihood that all visitation would cease is highly improbable.

Kilkenny's and Moeltner's reports materially overstate the economic impacts (if indeed there are any) of the proposed water withdrawals from the White Pine and Lincoln County region. The dichotomous, all-or-nothing approach that assumes complete devastation throughout both counties used in the analyses is not only a fundamental flaw in the reports but is also counterproductive to a meaningful discussion of Nevada's overall welfare and resource allocation planning. Additionally, Kilkenny did not differentiate between county-wide economic data and economic activity directly related to the four basins, and the extent to which occurrences in the basins affect the remainder of the counties. The drastic environmental and economic impacts alleged particularly by Kilkenny are refuted by substantiated, scientific evidence contained in multiple reports submitted by experts retained by the SNWA, including, but not limited to, Pete Rowley (issues pertaining to geology); Andrew Burns and Warda Drici (issues pertaining to hydrology); Zane Marshall, Lisa Luptowitz and Terry McLendon (issues pertaining to the environment); and Rick Holmes, Dennis Peseau, George Carter, Carl Linvill and John Candelaria (issues pertaining to the basin of origin).

Furthermore, the economic value calculations (which are also flawed in a number of ways; these flaws are discussed in detail below) by Kilkenny and Moeltner fail to consider the potential benefits to both southern Nevada and Lincoln and White Pine Counties resulting from alternative uses of the water in question. Considering only the economic benefits generated by establishing the required infrastructure, the proposed water withdrawal project would require a total investment of \$3.2 billion (2007 dollars), which includes construction, construction management, and design costs. Such a large-scale investment in the region would generate thousands of jobs, millions of dollars in salaries and wage payments to these workers, and result in substantial indirect and induced beneficial economic impacts throughout the regions where work would take place.

By ensuring water resource certainty in southern Nevada, the fiscal health of the state of Nevada is protected. Southern Nevada accounts for more than 73 percent of the state's gross domestic product; 73 percent of statewide sales taxes collected; 76 percent of the state's general fund revenue;<sup>2</sup> and its resort industry alone funds approximately 46 percent of state general fund tax revenues through the payment

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<sup>2</sup> See, "Analysis of Nevada General Fund Revenue and Expenditure Distributions," prepared by Applied Analysis for Clark County, Nevada in April 2009.

of more than \$2 billion annually in gaming, property and sales tax.<sup>3</sup> Taxes generated in Clark County fund K-12 education, higher education, Nevada Medicaid, social and human services and other government programs for residents throughout the rest of the state. Clark County is a net export county in the context of the state's fiscal system; several examples of this concept are provided below.<sup>4</sup>

- Under Nevada's K-12 funding plan, Lincoln County received \$9,644 in state support per student in 2008, White Pine County received \$6,696, and Clark County received \$4,891.<sup>5</sup> Otherwise stated, Lincoln County and White Pine County's education systems are subsidized by tax revenue generated in Clark County.
- As another example of Clark County's financial support of the rest of the state, consider the state's Medicaid Disproportionate Share Hospital ("DSH") allocations to the hospital system. Although Clark County comprises approximately 71.9 percent of the state's population, it is required to pay 97.6 percent of the state match for federal funding, but only receives 41.9 percent of the net benefit.<sup>6</sup> Said otherwise, Clark County provides material financial support to hospitals throughout rural Nevada. Based on fiscal year 2009 data, Clark County exports approximately \$58.9 million each biennium (\$29 million per year) in the DSH program alone.
- Finally, consider the state's consolidated tax system. Nine of Nevada's counties ("Guaranteed Counties") receive a guaranteed monthly allocation of Supplemental City-County Relief Tax (SCCRT) regardless of their SCCRT receipts. The remaining counties' ("Point of Origin Counties") SCCRT distribution is in proportion to the amount of their in-state collections to the state as a whole after the Guaranteed Counties have first received their allocation.<sup>7</sup> Clark County is a Point of Origin, or a subsidizing county. White Pine County and Lincoln County are Guaranteed Counties, or subsidized counties.

Careful consideration of the impact that a water resource uncertainty would have on the economic and fiscal strength of southern Nevada, upon which the state depends for three-quarters of general fund revenue, is critical to the economic and fiscal health of both southern Nevada and the counties of White Pine and Lincoln. Based on the factors cited above, it is likely all areas involved would report a net economic benefit if the proposed water withdrawal plan moves forward. Conversely,

<sup>3</sup> Source: Nevada Resort Association, "The Facts about Gaming in Nevada," February 2011.

<sup>4</sup> See, "Analysis of Nevada General Fund Revenue and Expenditure Distributions," prepared by Applied Analysis for Clark County, Nevada in April 2009.

<sup>5</sup> Id.

<sup>6</sup> Id.

<sup>7</sup> Nevada Department of Taxation; see presentation to the 2011 Legislative Session on February 10, 2011, <http://www.leg.state.nv.us/Session/76th2011/Exhibits/Senate/REV/SREV137C.pdf>

if water resource uncertainty were to impact southern Nevada, the fiscal and economic consequences would likely be felt in White Pine and Lincoln counties. That said, it is important to note that based on environmental analysis performed by the SNWA experts named above and Nevada state law's strict limitations on impacts to existing water users, it is equally likely that if the proposed water withdrawals occur, most, if not all, of the residents in these areas will not report any noticeable change in their respective ways of life.

## Rebuttal of Kilkenny Report

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Kilkenny's report is entitled "Report on the Known Economic Market and Non-Market Values of Water in Nevada's Spring, Cave, Dry Lake, and Delamar Valleys," and its introduction states that it serves to briefly enumerate and explain the economic values of the agricultural and recreational uses of water, as well as the existence value of water that is not used, in four valleys in the state of Nevada. This rebuttal report addresses a number of statements made by Kilkenny. Statements from Kilkenny's report that are rebutted are provided below, followed by analysis of each citation. Note that citations from Kilkenny's report are generally printed in italics to easily distinguish them from rebuttal remarks.

*"Water cannot be in two places at once. If it is piped to the Las Vegas area it would not be available to maintain the pastures, cropland, streams, wetlands, forests or the water table in the basins of origin and downgradient basins that depend on interbasin flow from the basins of origin. Guzzlers would go dry. Livestock and game would not be able to graze. The fragile ecosystem would be altered and flora and fauna populations would dwindle. The water withdrawals could turn the region into an uninhabitable wasteland [sic]"*  
*(Page 1)*

**Rebuttal:** The statement above appears to be conclusory, unsubstantiated in the report, not footnoted or sourced to any reliable evidence, overly simplistic and its presence is designed to be inflammatory in nature. To suggest that the proposed groundwater transfer is so dichotomous in nature that if it occurs the mid-eastern area of the state will become an "uninhabitable wasteland" is a generalization that relies on a "slippery slope" mentality rather than scientific evidence. A review of Kilkenny's qualifications does not reflect any formal training or expertise in hydrology or environmental science. As such, these conclusory statements amount to little more than rhetoric, undermining the purported analytical nature of Kilkenny's report.

The drastic environmental and economic impacts cited by Kilkenny are refuted by substantiated, scientific evidence contained in multiple reports submitted by experts retained by the SNWA, including, but not limited to, Pete Rowley (issues pertaining to geology); Andrew Burns and Warda Drici (issues pertaining to hydrology); Zane Marshall, Lisa Luptowitz and Terry McLendon (issues pertaining to the environment); and Rick Holmes, Dennis Peseau, George Carter, Carl Linvill and John Candelaria (issues pertaining to the basin of origin). A discussion of these expert's reports is not appropriate here, but what is germane to this analysis is the noticeable absence of substantiated evidence supporting Kilkenny's conclusory statement. Kilkenny's report assumes that should the proposed water withdrawals occur in the four distinct valleys, the following industry sectors will be obliterated throughout both counties: agriculture, mining, ranching, farming, forestry, hunting, tourism, recreation, lodging,

and restaurants. As previously stated, this cannot be the case. The stated intent of the SNWA, state water laws and federal environmental laws all would prohibit such an outcome from occurring.<sup>8</sup> Also, no evidence exists that impacts (if any) in the four basins would spread throughout the counties.

While visiting the U.S. Department of Agriculture (USDA) Forest Service website to obtain general information on several of the natural areas mentioned in Kilkenny's report, AA observed that at least several of these areas would not be in danger of becoming "arid" due to any proposed groundwater transfers. According to the USDA's website on July 26, 2011, the Cleve Creek area of the Forest, which is mentioned in Kilkenny's report, is extremely hazardous due to heavy flooding from melting snow. Kalamazoo Creek, also mentioned in Kilkenny's report, was also reported to be closed to through-travel due to numerous large snow drifts on the back side of the road. Within the Ely Ranger District, six creeks located in either the Schell Creek Range or the Mount Moriah Division, both of which are included in Kilkenny's economic value calculations, are flooded or washing away roads because of melting snow, causing the areas to be closed to traffic or otherwise impassable.

*"Thus the area is also a recreational destination used by hikers, bikers, birdwatchers, nature photographers, and hunters from across the state and around the world." (Page 1)*

**Rebuttal:** Kilkenny's statement suggests that the valley basins of Lincoln and White Pine counties are destinations for domestic and international travelers. However, an Internet search of travel and tourism-oriented websites that might describe the "recreational areas" referenced by Kilkenny (e.g., Spring Valley Basin, Cave Valley Basin, Dry Lake and Delamar Basin) turns up nothing that could reasonably be considered to fit the description of a tourism resource, and it is very difficult to even determine where the four basins are on a map. The Lincoln County homepage ([www.lincolncountynv.org](http://www.lincolncountynv.org)) link for visitors was still under construction as of July 25, 2011, but it does say that "Lincoln County, Nevada is a land filled with mountain ranges, windswept valleys, wild horses, cattle ranches and folks that like the country life." It does not mention the basins referred to as global destinations in Kilkenny's report. The website for the "White Pine Tourism Board" ([www.elynevada.net](http://www.elynevada.net)) describes the outdoor recreation offerings in the area as follows:

"There is plenty to choose from. Climb majestic Mount Wheeler that is over 13,000 feet in elevation, or visit the Great Basin National Park on the County's eastern border. Fly fish at Cave Lake State Park (which boasts the state record 27 pound German Brown Trout) fourteen miles southeast of Ely, or ski at the

<sup>8</sup> Refer to NRS 533.370 as well as footnote 1 of this analysis for further detail.



Ward Mountain Recreation Area and Trail System, just six miles from the Ely City limits.

Spend an afternoon rock hounding at Garnet Hill. Picnic or camp in one of the area's developed campgrounds. Watch, photograph, or hunt the state's largest elk herd, second largest mule deer herd, and third largest antelope herd. Head for the hills to camp, hike, or fish in any of our streams and you're likely to have an entire mountain to yourself."

The language above indicates that the recreation areas within White Pine County are relatively remote and desolate, receiving few visitors. A search for further information on the Great Basin National Park referenced on the White Pine Tourism Board's website turns up much more detailed information that would be useful for potential visitors. The National Park Service, which owns and operates the Great Basin National Park, states on its website ([www.nps.gov/grba/index.htm](http://www.nps.gov/grba/index.htm)) that the Great Basin is perceived as a desolate area: "Called dead, barren, and desolate, visitors are surprised to find it's alive, fruitful, and full of wonders."

According to the Park Service, the Hydrographic Great Basin (of which the Great Basin National Park is a part) is "a 200,000 square mile area that drains internally. All precipitation in the region evaporates, sinks underground or flows into lakes (mostly saline). Creeks, streams, or rivers find no outlet to either the Gulf of Mexico or the Pacific Ocean." The Great Basin includes most of Nevada, half of Utah, and sections of Idaho, Wyoming, Oregon, and California. According to the Park Service, the term "Great Basin" is slightly misleading as the region is actually made up of many small basins. It appears that Kilkenny's four referenced valleys, or basins, are four of these "small basins" to which the National Park Service refers. It is possible that some of the Great Basin's 88,870 visitors in 2010<sup>9</sup> who came to visit what the Park Service refers to as "far from a wasteland" were from outside the United States; however, the likelihood that impacts on the order assumed by Kilkenny would materialize are suspect, at best.

Even if some international – or domestic – travelers made their way to the Great Basin National Park because of the visibility provided by the National Park Service, and then visited the surrounding areas, or even made the surrounding areas their destination, Kilkenny fails to quantify what her analysis is referring to when it characterizes the region as "a recreational destination used by hikers...from around the world." Furthermore, this characterization as a global destination appears to contradict White Pine Tourism Board's statement that one can: "Head for the hills to camp, hike, or fish in any of our streams and **you're likely to have an entire mountain to yourself** [emphasis added]."

<sup>9</sup> Source: National Park Service, Great Basin National Park, Park Statistics (<http://www.nature.nps.gov/stats/park.cfm?parkid=382>)

Based on the White Pine Tourism Board's own assessment, and the lack of visitor information provided by Lincoln County, it does not appear that the small basins in Lincoln County and White Pine County are magnets for domestic or global travelers coming from around the world, and ultimately, that is not what Lincoln County or White Pine County desires; otherwise, the counties and communities would have made more of an effort to market these areas and make information about them accessible.

In contrast, the Las Vegas Convention and Visitors Authority ("LVCVA") tracks Las Vegas visitor demographics with statistical precision with the assistance of San Francisco-based market research and public polling firm GLS Research, surveying thousands of visitors throughout the year and reporting these results annually in a publication entitled "Las Vegas Visitor Profile Study." In 2010, the LVCVA reported that 18 percent of the approximately 39 million visitors to Las Vegas were international, and based on spending profiles, represented 27 percent of the region's tourism revenues.<sup>10</sup> According to the LVCVA, it promotes Las Vegas globally with the help of 15 partner offices representing more than 70 countries.<sup>11</sup>

From 2005 to 2009, Las Vegas international visitor counts hovered around 5 million annually, and in 2009 alone, international visitors spent an estimated \$5.1 billion in the region on lodging, dining, shopping, entertainment, sightseeing, local transportation and gaming, thereby directly supporting 43,400 jobs and nearly \$1.6 billion in wage and salary payments; these figures increase to 71,200 jobs and \$7.8 billion in economic output when including indirect and induced impacts.<sup>12</sup> Based on increasing international visitation counts in the latest year, these figures are expected to be even higher in 2010 and 2011.

With Las Vegas, Nevada representing the fourth most-visited destination in the United States,<sup>13</sup> the region's position as a nationally-important tourism destination is clearly evident. What's more, many visitors to Las Vegas report travelling to nearby attractions.<sup>14</sup> Among those who planned to visit other places during their trip to Las Vegas (13 percent of total visitors in 2010, or approximately 5 million people), 64 percent visited the Hoover Dam, 61 percent visited the Grand Canyon, 20 percent

<sup>10</sup> LVCVA, June 30, 2011 press release, "New Data Reveals Record International Visitation for Las Vegas", see <http://www.lvcva.com/press/press-releases.jsp?presId=1126>.

<sup>11</sup> Id.

<sup>12</sup> Source: LVCVA Economic Impact Series, Volume II, Issue I, "The Impact of International Visitors on Southern Nevada," released in December 2010 and prepared by Applied Analysis for the LVCVA.

<sup>13</sup> Source: LVCVA Economic Impact Series, Volume I, Issue VIII, "The Relative Dependence on Tourism of Major U.S. Economies," released in January 2010 and prepared by Applied Analysis for the LVCVA.

<sup>14</sup> See, Las Vegas Convention and Visitors Authority and GLS Research, 2010 Visitor Profile Study, <http://www.lvcva.com/gefile/107/2010%20Las%20Vegas%20Visitor%20Profile.pdf>

went to Lake Mead, and 6 percent reported visiting both Zion National Park and Bryce Canyon.<sup>15</sup>

*“All these activities and attractions are the basis of the livelihoods of about 6,000 people, plus public sector employment for about 1,000 more individuals. As this report shows, the water withdrawals may undermine employment of over 3,000 people, causing the unemployment rate in White Pine County to rise to 53% from 8% in April 2011, and Lincoln County’s unemployment rate to rise to 46% from 12% in April, 2011.” (Page 1)*

**Rebuttal:** The total labor force (employed and unemployed individuals) in White Pine County is comprised of 5,069 individuals, while the total labor force in Lincoln County is comprised of 1,703 individuals.<sup>16</sup> This rebuttal report is not intended to minimize the potential economic impact of these workers, but it is worth noting from a macro-economic perspective the relative nature of the potentially affected areas. The combined labor force of Lincoln and White Pine County represents 0.70 percent of the total labor force in Clark County (969,098 individuals).<sup>17</sup> Employed individuals in White Pine County and Lincoln County total approximately 4,588 and 1,475, respectively, while total employment in Clark County is estimated around 821,597.<sup>18</sup> As such, combined employment in White Pine County and Lincoln County represents 0.74 percent of total employment in Clark County.

Not only does Kilkenny fail to differentiate between county-wide employment data and employment directly related to the basins in question, but she also assumes economic devastation to the entire employment base of both counties (50-percent decline). A more carefully-crafted analysis would have utilized an alternative outcome scenario approach. Each scenario would first provide quantification (ideally in the form of a range) of the economic and employment data directly linked to the four basins as a proportion of county-wide economic and employment data. Secondly, the study would have provided a range of impacts on only the economic and employment data directly linked to the four basins. By simply assuming that countywide employment will be reduced by 50 percent, without even attempting to differentiate between jobs with and without a critical link to the basins at issue, Kilkenny raises questions about the credibility of her analysis as such an assumption reflects a significant bias toward a specific outcome.

In contrast, in our original report,<sup>19</sup> AA estimated that a water resource restriction imposed upon the Southern Nevada region would result in 14,000 jobs lost in the case of a mild growth interruption (a 1.7-percent decline in economic output), while our

<sup>15</sup> Id.

<sup>16</sup> 2010 annual figures per the Nevada Department of Employment, Training and Rehabilitation.

<sup>17</sup> Id.

<sup>18</sup> Id.

<sup>19</sup> See AA’s report, “Potential Impacts of Water Resource Uncertainty in Southern Nevada.”

most aggressive assumption indicated that a more severe growth interruption (or a 10.5-percent decline in economic output) would result in 84,000 jobs lost. Notably, a 10.5-percent decline in southern Nevada economic output would result in a loss of jobs that is equivalent to 14 times the combined employment in Lincoln and White Pine Counties.<sup>20</sup> This figure would likely be an understatement according to Kilkenny's all-or-nothing methodology because existence of the entire southern Nevada economy depends on continued access to non-local water resources.<sup>21</sup>

Clark County reports approximately 0.69 employees per acre-foot of water based on current usage (approximately 821,000 jobs as cited above and annual water demand of 570,000 acre-feet according to SNWA estimates). Given the project at issue involves applications for 128,000 acre feet, this would equate to approximately 184,000 jobs in Clark County. Assuming levels of economic output per employee cited in AA's original report (\$114,000 per employee), 184,000 jobs and \$21.0 billion in gross domestic product would be supported in southern Nevada if the proposed groundwater withdrawals move forward, in addition to the stabilization of existing jobs and economic output.

*"This report updates all economic measures of industry or market uses of water in agriculture, hunting, and recreation. It updates or summarizes the existing estimates of the indirect or interindustry market economic values at stake due to the proposed water withdrawals as well. Furthermore, it summarizes the most recent estimates of the non-market values of the water resources and amenities in the counties where the basins are." (Page 2)*

**Rebuttal:** Although Kilkenny has gone to the lengths of offering the non-use non-market value of water resources in the area, she has failed to consider any alternative uses of this water and the economic values of such alternative uses. Specifically, Kilkenny values water resources from the perspective of "people anywhere – even people who never visit the area or directly use the water" (page 3), but fails to even consider the benefits of utilizing water from the area for other purposes.

Furthermore, in estimating the non-use non-market economic values of the water, Kilkenny presumes that the population of Nevada and Utah would pay money to know that the water exists where it is today, but does not address what their preference would be if given a survey that accurately describes the circumstances surrounding the proposed groundwater withdrawals. (See page 16 of Kilkenny's report, where she states, "In sum, conservatively estimating the stakeholding public by the number of households in just the two states of Nevada and Utah, the

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<sup>20</sup> Id.

<sup>21</sup> Id.

*estimated non-market value of the two wetlands together is more than \$2 million annually.”)*

We would argue that the preferences of Utah households should be excluded from any discussion of Nevada’s water resources, and that the majority of Nevada households should also be assumed to not answer the willingness-to-pay<sup>22</sup> question the way that Kilkenny presumes that they would. Seventy-two (72) percent of the Nevada population resides in the Las Vegas metropolitan statistical area. If this group were given a choice between water resource certainty in southern Nevada and “knowing that water exists” where it is physically located today in four sparsely populated basins of the mid-eastern portion of the state, it is likely that many of them would choose the former.

Moreover, Kilkenny states that the \$2 million annual non-market value of the Swamp Cedar Natural Area (SCNA) and Shoshone Pond Natural Area (SPNA) valued in Moeltner’s report is “conservative.” In fact, in his report’s Executive Summary, Moeltner states a range of estimated impacts, with \$1.97 million at the top end (resulting in a 70-year present value of \$74 million), and a low-end estimate of \$1.12 million (resulting in a 70-year present value of \$42 million) for the SCNA and SPNA areas. The top end of Moeltner’s range does not even include the \$74 million; rather, he more conservatively concludes his range at \$70 million. Specifically, Moeltner stated on page 2 of his report:

“Depending on the projected impact scenario, the discounted present value of total economic losses to Nevada and Utah households associated with the disappearance of these wetlands are estimated to lie between \$42 million and \$70 million for a 70-year time horizon.”

This practice of citing values from another researcher’s study and only taking the highest possible value, or a value higher than the highest possible value, is repeated on page 14, which notes, “*Moeltner relied on an existing BT study valuing outdoor recreation per visitation day by Rosenberger and Loomis (2001) to estimate the economic value of these two areas. His per visitation day use-value estimate is \$42. Rounding up the visitation counts slightly to 6,000 and 12,000, respectively, because the counts ended in mid October, he estimated that the sum non-market use values for the CCCG [Cleve Creek Recreation Area] and SPRA [Sacramento Pass Recreation Area] areas together is \$756,000 per year.*”

In fact, Moeltner estimated the per-person and activity day benefits to lie in the “\$6-\$42 range” for both the CCCG and SPRA areas. In the text of his report on page 2, Moeltner cites an economic value falling between \$35,000 and \$254,000 per year for

<sup>22</sup>See detailed discussion regarding willingness-to-pay values in the subsequent rebuttal statement.

CCCG and between \$71,000 and \$508,000 per year for SPRA, for a combined range of \$106,000 to \$762,000. However, in his “Summary Table of Key Results” also on page 2, he actually adjusts this range downward to between \$108,000 and \$360,000 for the two areas combined. For reasons that are unexplained, Kilkenny’s report omits any mention of these ranges and cites a value at the highest end of the range, which is actually twice as large as the value of the maximum economic value that Moeltner provides in the “Summary Table of Key Results.”

Furthermore, Kilkenny’s analysis does not consider whether additive, incremental net benefits for the state and local counties could be derived from the utilization of some water resources from the Lincoln-White Pine region in other areas.

*“The fifth benefit is the value that people anywhere – even people who never visit the area or directly use the water – place on the existence of the natural amenities in the place. This last type of economic benefit is the ‘existence’ or ‘non-use’ non-market value.” (Page 3)*

**Rebuttal:** The non-use non-market value of water refers to the value of people being happy to know that this water exists, even if they never see it. Although subject to controversy, the contingent valuation method (“CV method” or “CVM”) is a non-market valuation method that is typically used in environmental impact assessments. However, the method is subject to significant criticism.<sup>23</sup> The criticism revolves primarily around two aspects; namely, the validity and the reliability of the results, and the effects of various biases and errors. The CV method can be used to assess the willingness-to-pay (“WTP”) values of an environmental resource. Within the context of the CV method, for a proposed welfare gain due to provision of public good, the compensating variation refers to the amount of money income that has to be given up by the consumer to attain increased level of utility (the WTP measure).<sup>24</sup> A variation of this measure is the amount of compensation required to be provided to the individual so that he or she could attain an improved utility level in case the provision of the public good does not take place is called the willingness-to-accept (“WTA”) measure.<sup>25</sup> One difficulty that arises is that it has been demonstrated both theoretically as well as empirically that the WTA value is always greater than the WTP value if used for the same issue.<sup>26</sup> This disparity reasonably raises questions about the credibility of both values given by the individual if attempting to apply that value to an economic model.

Other publicly-available criticism of the CV method includes:

<sup>23</sup> Venkatachalam, L. “The contingent valuation method: a review”, Institute for Social and Economic Change, Bangalore, India. June 2003.

<sup>24</sup> Id.

<sup>25</sup> Id.

<sup>26</sup> Id; see Venkatachalam’s reference to seven sources regarding this statement on page 92.



- “Respondents to a CV survey are inherently unresponsive to the characteristics of the good being valued”<sup>27</sup> (Carson, 1997)
- “Surveys designed to test for consistency between stated willingness-to-pay and economic theory have found that contingent valuation responses are not consistent with economic theory. The main contingent valuation anomaly...is called the “embedding effect,” and was first analyzed systemically by Kahneman and Knetsch (1992). The embedding effect is the name given to the tendency of willingness-to-pay responses to be highly similar across different surveys, even where theory suggests (and sometimes requires) that the responses be very different. [A widely-cited example of the embedding effect is the results of a CV study by Kahneman in 1986 on conservation of fish in lakes that showed that the WTP value for cleaning up all the lakes in Ontario (larger area) was only slightly higher than the WTP value for cleaning up lakes in one region (smaller area).”<sup>28</sup> (Diamond and Hausman, 1993)
- “A disadvantage [of willingness-to-pay and other “stated preference” surveys] is that survey results can be affected by strategic responses, or responses that are designed to influence the outcome of the research, rather than by honest responses. Researchers have also found that some people are not willing to trade money for a loss in environmental quality.”<sup>29</sup> (Raheem, 2009)
- “Despite the fact that discrete methods have been shown to produce higher WTP estimates, the National Oceanic and Atmospheric Administration (NOAA) panel concluded that contingent valuation studies should be based on the single bounded dichotomous choice (SBDC) approach because this approach more closely resembles familiar market and voting decisions (Arrow *et al.*, 1993; Welsh and Poe, 1998). However, many researchers have expressed concern about this recommendation. First, as discussed above, some researchers worry about the potential for the DC approach to result in overestimates of WTP. Second, relative to continuous methods, the DC approach provides less statistical information per observation, thus, the resulting survey responses reveal little about an individuals' WTP (Herriges and Shogren, 1996). Finally, the SBDC approach requires the researcher to select a distribution of bid amounts, which is a difficult task. An inefficient set of bid amounts may influence mean WTP estimates (Kanninen, 1993). In addition,

<sup>27</sup> Carson, R.T., “Contingent Valuation Surveys and Tests of Insensitivity to Scope”, Department of Economics, University of California, San Diego, 1997, published and presented in multiple venues. Carson argues against this claim, but provides examples of where such criticisms can be found.

<sup>28</sup> Diamond, P.A. and Hausman, J.A., “Contingent Valuation: Is Some Number Better than No Number?” *Journal of Economic Perspectives*, Autumn 1993.

<sup>29</sup> Raheem, N. et al, “The Economic Value of Coastal Ecosystems in California”, *Global Conservation Assistance et al.*, 2009.

the SBDC method is inclined to biases, including anchoring effects and "yea-saying". Anchoring occurs when respondents consider the given bid amount to be a good estimate of the true value of the commodity being valued (Mitchell and Carson, 1989). Yea-saying refers to the tendency of some respondents to agree with an interviewers' request regardless of their true views (Arndt and Crane, 1975). This bias results in higher WTP estimates in comparison to OE [open-ended question] approaches."<sup>30</sup> (Tkac, 2002)

Ultimately, whether or not the non-use or non-market value of something taken away or added is calculated accurately, it represents a value that will never be financially recognized in the region. Non-use, non-market values do not generate economic output, tax revenues, jobs, or any other concrete benefits other than assumed "enjoyment values," including an extrapolation of enjoyment values for those who do not know the region exists and/or those who "hate" (Kilkenny page 16) the region. Kilkenny's valuation method also fails to consider, much less value, alternative uses for the resource.

Despite Kilkenny's assignment of a non-use non-market value for the Swamp Cedar Natural Area (which can only be reached via dirt roads branching from Highway 50) and the Shoshone Pond Natural Area (which, notably, consists mainly of three *man-made* ponds), no survey – scientific or otherwise – has ever been done for either area. Instead, Kilkenny "transfers" the value assigned to "similar areas" in other surveys found in the public domain to the two wetlands in Nevada, based on a report by Klaus Moeltner (Moeltner's report is also rebutted by AA; see below.) The necessity to correctly design a survey is one of the concerns outlined by Tkac in her 2002 master thesis (which is one of the studies cited by Moeltner), but it appears that Kilkenny's report does not take into consideration the nature of the questions asked in the surveys regarding "similar areas" and whether it would be appropriate to apply the results of those surveys to Kilkenny's own conclusions.

Furthermore, Kilkenny states that the *"reported values reflect the value of the entire bundle of wetland services, including habitat and biodiversity provision, flood control, water filtration, and opportunities for non-consumptive uses (wildlife viewing, hiking, photography) and consumptive uses (hunting, fishing) recreational activities, as well as pure existence (non-use) values."* (Page 15)

It is unclear how man-made ponds would be stripped of the "bundle of wetland services" cited by Kilkenny above should the proposed groundwater transfer occur. Kilkenny fails to substantiate that extensive wetland services presently exist. In any

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<sup>30</sup> Tkac, J., "Estimating Willingness to Pay for the Preservation of the Alfred Bog Wetland in Ontario: A Multiple Bounded Discrete Choice Approach", Master Thesis for the Department of Agricultural Economics, MacDonald Campus, McGill University, Montreal, Quebec, 2002.



case, any hiking in the area could continue even if the man-made ponds were to be affected by a groundwater transfer.

Kilkenny emphasizes in her report that in the surveys used in her “transfer” of value to the wetlands in Nevada, the *“share of users that had visited the wetland under consideration in each survey...was small...the ‘lion’s share of estimated economic benefits (i.e. reported WTP) is likely associated with non-use or existence values.”*

Notably, one of the wetlands considered to be a “similar” area to the Shoshone Ponds Natural Area in Moeltner’s report was the Alfred Bog in Ontario, Canada. The Alfred Bog is a 10,000-acre region considered the highest quality bog ecosystem in Ontario; it is classified as an Area of Natural and Scientific Interest by the Ontario Ministry of Natural Resources and considered for the Ramsar List of Wetlands of International Significance.<sup>31</sup> The Alfred Bog has been building for 10,000 years.<sup>32</sup> The comparability issues to the two small Nevada areas are readily apparent. Moreover, it is unlikely that any individual (who will never visit either area) would pay a similar amount to: a) know that three man-made ponds exist in Nevada (for which the water source may be intentionally “turned off”)<sup>33</sup> or b) know that the 10,000-year old Alfred Bog is not made extinct by draining, burning and peat extraction.

*“The overall annual value is \$74 million, which has a cumulative discounted present value of \$2.85 billion at 2% discount rate over the SNWA’s 70 year planning horizon. Note that this amount includes only the values of the portions of the resources in the four valleys that have been measured to date. It is therefore an incomplete measure that underestimates the economic value of the water in the four valleys.” (Page 3)*

**Rebuttal:** First, the net present value calculation appears to be incorrect. The present value of \$74,190,030 in payments each year at a 2 percent discount rate over a 70 year period is \$2.78 billion, not \$2.85 billion.

Secondly, in developing an economic value of the “water in the four basins”, Kilkenny includes the total value of each activity in both counties (agriculture, hunting, park visitation, recreation and existence) and attributes the total value of each (including direct values, input-out values, and values assigned through “benefit transfer”) to the water in the four basins. In doing so, Kilkenny attributes 100 percent of the value of the five “activities” to water in the four basins. Kilkenny’s statement appears flawed for three reasons:

<sup>31</sup> Source: <http://www.ofnc.ca/conservation/alfredbog/index.php>

<sup>32</sup> Id.

<sup>33</sup> Source: U.S. Department of the Interior, Fish and Wildlife Service, Federal Register Vol. 69, No. 64, April 2004; see [http://www.fws.gov/nevada/protected\\_species/fish/documents/pp/fr\\_poolfish.pdf](http://www.fws.gov/nevada/protected_species/fish/documents/pp/fr_poolfish.pdf). Page 17384 states: “Poolfish at Shoshone Ponds Natural Area were lost to vandalism in 1974 when the water source was intentionally turned off.”

- 1) Numerous other factors are essential to the existence of the five activities;
- 2) These activities are not 100 percent dependent on the existence of any water, particularly park visitation and recreation; and
- 3) Kilkenny provides no scientific evidence that the proposed groundwater transfers will cause the extinction of, or even remotely impact, the ability of any of these activities to continue as going concerns.

Without sourcing any scientific evidence to back up her claim, Kilkenny states unequivocally that all agricultural activity, all hunting, and all recreation in the area will cease to exist if the proposed groundwater transfer occurs, while park attendance will fall to zero. Clearly this will not be the case. For example, with respect to agricultural activity reliant on snow melt, the groundwater withdrawals in this project will not affect their water source; furthermore, existing laws prohibit affecting water rights of the agricultural industry.<sup>34</sup>

Moreover, the claim that economic activity attributed to these five activities totals \$74 million annually appears somewhat inflated, even if sourced to a “multiplier” used in a six-year old report (from Harris and Wright, 2004). For example, Kilkenny attributed \$52 million in annual direct and indirect economic value to the agricultural industries in White Pine and Lincoln Counties. However, according to the Bureau of Economic Analysis (“BEA”), farm receipts in the two counties totaled \$31 million in 2009 (which is consistent with Kilkenny’s direct production revenue measure),<sup>35</sup> but total farm net income, including corporate farms, is reported as a net loss for both counties.<sup>36</sup> Considering that salaries, wages and other compensation to farm laborers, owner-operators of farm sole proprietorships, farm partnerships and family-held farm corporations reported by the BEA totaled only \$5.5 million during the same year, it seems aggressive to assume that the agriculture industry and its employees could generate an additional \$22.2 million in local, indirect economic output annually.

*“The proposed water withdrawals would directly displace 1,503 working people and farmers, and 1,173 people from linked sectors, according to the 1.78 employment multiplier estimated by Harris and Wright (2004). The estimated total employment impact would be 2,676 jobs lost in the county. If the displaced workers stay in the county, the proposed water withdrawals would **raise White Pine County’s unemployment rate to 53%** from 8% (April 2011 county unemployment levels and rate source: NV DETR).” (Page 5)*

<sup>34</sup> Refer to NRS 533.370 as well as footnote 1 of this analysis for further detail.

<sup>35</sup> Source: Bureau of Economic Analysis

<sup>36</sup> Id.

**Rebuttal:** Kilkenny’s analysis assumes that 100 percent of the 756 mining-related jobs, 100 percent of the 535 jobs in hotels and restaurants, 100 percent of the 160 jobs in agriculture, and 100 percent of the jobs in forestry in White Pine County would be eliminated as a result of the proposed water withdrawals from the region. This assumption is unfounded and highly unlikely. Kilkenny states that these sectors “*would not be there without the local water,*” implying she is assuming that the proposed water withdrawals will result in White Pine County being completely devoid of water.

In addition, Kilkenny’s conclusion on page 5 that, “*the proposed water withdrawals would **raise White Pine County’s unemployment rate to 53%***” appears to directly contradict her statement on page 1 that “*the relocation of the humans from the areas dependent upon the water would also add to the current unemployment burdens in other Nevada counties or states that the people displaced from White Pine and Lincoln counties relocate to,*” which presumes that residents would leave the area if the proposed water withdrawals occur.

*“The proposed water withdrawals would directly displace 419 people from their jobs in agriculture and hunting and recreation sectors, 327 people from jobs in linked sectors, to total an estimated loss of 746 jobs. A **deterioration of employment of that magnitude would raise Lincoln County’s unemployment rate to 46%** from the current rate of 12% (current unemployment data source: NV DETR).” (Page 7)*

**Rebuttal:** As previously stated, Kilkenny’s statement cannot be the case as both the stated intent of the SNWA and state law would prohibit such an outcome from occurring.<sup>37</sup> Even if one assumes *arguendo* that 100 percent of people working in agriculture, hunting and recreation sectors will lose their jobs if the proposed water withdrawals occur, the total figure, according to Figure 3 of Kilkenny’s report, is 167 jobs. If one assumes that Kilkenny meant to include 100 percent of the county’s jobs in mining, hotels and restaurants, the total rises to 344. It is unclear how Kilkenny derived a total of 419 jobs.

Again, the basic premise underlying Kilkenny’s report that the proposed water withdrawals will result in two counties being completely devoid of water should be questioned. The proposed water withdrawal plan does not intend to leave the area or any of the industries operating in the region absent of the water required to sustain the area or the industry. Assuming this is the case, few, if any, of Kilkenny’s cited impacts would be likely to occur.

<sup>37</sup> Refer to NRS 533.370 as well as footnote 1 of this analysis for further detail.

*“The local farm and ranch sector is expected to contract completely even if SNWA manages an operation with the same total head of livestock, because a single operation of that scale would purchase all inputs from suitably large suppliers located outside the local area.” (Page 8)*

**Rebuttal:** This statement, while appearing to describe a radical consequence, is unclear in its intended meaning and unsupported by any data or analysis. Kilkenny does not offer any explanation nor footnote the statement with any credible study.

*“Primitive camping is also allowed throughout the basins on both BLM and USFS lands. The right to sleep under the stars and to cook over a real campfire has become very rare. This area is one of the few left in the country where it is still allowed.” (Page 10)*

**Rebuttal:** According to RV-camping.org, a website dedicated to research and location of RV camping sites with extensive links to state-specific resources, free RV camping locations are available almost everywhere in Nevada. The site notes that the Bureau of Land Management (BLM) alone administers 67 percent of Nevada’s land area, and that the US Forest Service (USFS) and National Park Service (NPS) also have large areas of public land they administer for free RV camping. Free RV camping locations are usually primitive. The site also states:

*“From desert and mountain campgrounds to the bright lights of Las Vegas, you should have no trouble finding the perfect camping location. The Humboldt-Toiyabe is the largest National Forest in the lower 48 states, and offer the RV boondocker wonderful remote camping experiences. BLM encourages dispersed camping (boondocking) as well, and Nevada has over 47 million acres available.”*

AA confirmed that the BLM offers 48 million acres of land and that it does encourage primitive, or dispersed camping. According to the BLM site for Nevada:<sup>38</sup>

*“The public lands are open to camping. There is no fee for dispersed, primitive camping, but there is a limit to the number of days one may camp in the same location.”*

According to the U.S. Department of Agriculture (USDA) Forest Service, the Humboldt-Toiyabe National Forest encompasses 6.3 million acres, making it the largest national forest in the lower 48 states. Located in Nevada and a small portion of eastern California, the Forest offers year-round recreation of all types.

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<sup>38</sup> See, ([www.blm.gov/nv/st/en/prog/recreation/camping.html](http://www.blm.gov/nv/st/en/prog/recreation/camping.html))

The Ely Ranger District makes up approximately 1.1 million acres of the Humboldt-Toiyabe National Forest and extends over three Nevada counties: Nye, White Pine, and Lincoln. The Ely District offers three campgrounds. The entire Humboldt-Toiyabe National Forest offers 51 campgrounds.

Dispersed (or “primitive”) camping in the Humboldt-Toiyabe includes the Centerville Flat Campground Camping Area, Wolf Creek Trail, Lower Bluster Campground, Pavlak Campground, Upper Bluster Campground and Urdahl Campground. Other areas are available for Group Camping and RV Camping.

Based on the data outlined above, it is reasonable to conclude that even assuming hypothetically that the four basins referred to in Kilkenny's report become unsuitable for primitive camping because of the proposed groundwater transfers, there are nearly 50 million acres within these counties or the state available for campers to explore. In fact, the BLM alone manages two-thirds, or 67 percent of the state's land, all of which is available for primitive camping. If a camper desires a campground in which to sleep under the stars, there appear to be plenty of alternatives for developed campgrounds as well.

*“Primitive camping is also allowed throughout the basins on both BLM and USFS lands....Because entry, use, and camp site permits are not required there, much of the recreational use is not documented. Therefore this section can report the values of just the portion of visits that are documented. According to the 2006 testimony by Rajala, to measure the economic impact of park visitors, one first estimates the party visitor days from data on the number of visitations and the conservative average rate of \$70 local spending per party visitor day.” (Page 10)*

**Rebuttal:** Primitive camping, by the BLM's definition, is done in remote locations where campers must bring their own water and food. Kilkenny's assumption that primitive campers “conservatively” spend \$70 per day is questionable, even though Rajala (2006)<sup>39</sup> used this figure in her report and Harris (2006)<sup>40</sup> used it because Rajala used it. The campsite itself is free (according to the BLM) or perhaps \$4 per day if camping at a developed campground (as in the Ely Ranger District of the Toiyabe National Forest) and there are no shopping centers in the primitive campsites. At the high end, at Great Basin National Park, there is no fee for primitive camping, and developed campgrounds cost \$12 per day.<sup>41</sup> Additionally, if a person has travelled by foot or horse to a primitive campsite, it seems unlikely they could get back to a town or village to spend \$70 per day.

<sup>39</sup> Rajala, K. “Summary of Information Regarding the Economic Value Generated by Agricultural and Recreational Activity in Spring Valley, White Pine County,” June 2006.

<sup>40</sup> Harris, T. “Estimation of Economic Impacts of the Agricultural and Recreational Activities in Spring Valley Area<White Pine County: An Application of Input-Output Analysis,” 2006.

<sup>41</sup> See, <http://www.nps.gov/grba/playyourvisit/camping.htm>

In reviewing Rajala’s original report, AA noted that Rajala states, “To determine economic impact [of recreational activity in Spring Valley] the National Park Service uses a figure of \$70 per day and the Nevada Commission on Tourism uses a figure of \$150 per day. Because the recreational use in Spring Valley is outdoor recreation, it is difficult to identify local versus out-of-area visitors, and many of the visitors will camp rather than stay in motels. Accordingly, the analysis is based on a conservative estimate of expenditures of \$70 per day.”

AA noted that the National Park Service (“NPS”) published an updated version of the economic impact study utilized by Rajala in January 2011, six months prior to the date of Kilkenny’s report (June 30, 2011).<sup>42</sup> It is odd that Kilkenny failed to update her report with the most current data. Nevertheless, in reviewing the NPS report referenced by Rajala,<sup>43</sup> which notably was geared towards U.S. National Park Visitors rather than primitive campers on BLM lands, the following expenses were included when arriving at the \$70 per day estimate.

NPS Visitor Spending per Party Day/Night - Camp-In Segment

Camping fees	\$16.09
Restaurants and bars	10.29
Groceries, take-out food and drinks	13.40
Gas and oil	10.61
Admissions and fees	6.31
Other vehicle expenses	0.78
Local transportation	0.26
Clothing	2.95
Sporting goods	1.00
Souvenirs and other expenses	6.17
<b>Total</b>	<b>\$67.85</b>

Note that figures shown add to \$67.86 due to rounding.

Back-country campers were estimated to spend \$31.43 per party night, which included \$6.25 at restaurants and bars, \$4.48 on groceries and take-out food, \$6.76 on gas and oil, \$3.54 on admissions and fees, \$0.92 on clothing, \$2.47 on sporting goods, \$0.47 on other vehicle expenses and \$6.54 on souvenirs and other expenses. The type of camping that Kilkenny is referencing in her report, primitive camping, in which one will “cook over a real campfire” seems to more closely resemble back-country camping, minus the \$6.25 at restaurants and bars and \$6.54 on souvenirs.

<sup>42</sup> National Park Service and Michigan State University, “Economic Benefits to Local Communities from National Park Visitation and Payroll, 2009.” January 2011. See, <http://www.nature.nps.gov/socialscience/docs/NPSSystemEstimates2009.pdf>

<sup>43</sup> National Park Service and Michigan State University, “Economic Impacts of National Park Visitor Spending on Gateway Communities: Systemwide Estimates for 2001.” April 2003. See, [http://35.8.125.11/mgm2\\_new/files/NPSSystem2001.pdf](http://35.8.125.11/mgm2_new/files/NPSSystem2001.pdf)



Even the official website for the U.S. National Park in Nevada, Great Basin National Park, warns: “This is a remote area with limited services, so please plan ahead!”<sup>44</sup> This would imply the camper should buy appropriate camping cuisine (e.g., canned foods) and bottled water and fill up on gas prior to embarking on a trip to Great Basin National Park. Had Kilkenny referenced the original report from the National Park Service used by Rajala (who was cited by Harris), it is likely that the “conservative average” party visitor spending per day may have been estimated at closer to \$20 per party day/night.

To compare these figures with visitor spending data for other parts of Nevada, according to the Las Vegas Convention and Visitors Authority, the average visitor to Las Vegas spends approximately \$645 per trip (not including gaming spending; average trip length is 4.6 days), or \$140 per day.<sup>45</sup> Average spending per trip increases to approximately \$1,018 when including reported gaming budgets, or to a total of \$220 per day in estimated gaming and non-gaming expenditures.<sup>46</sup>

*“At the visitor day: party visitor day conversion rate implicit in Rajala (2006), that amounts to 55,633 party visitor days. At \$70 spending per party visitor day this indicates \$3.89 million in recreational visitor related economic activity in the area. Furthermore, according to Harris, et al (1994) 1.59 is the output multiplier for the Amusement and Recreation Sector in White Pine County, as calculated by the IMPLAN model (Minnesota IMPLAN Group, 2000). This indicates that each dollar spent on recreation and amusement is associated with another \$0.59 dollars in the rest of the White Pine County economy. Thus, the **total annual economic impact** of the \$3.89 million spent by the 88,870 **annual park visitors** is estimated to be **\$6.2 million.**” (Page 10-11)*

**Rebuttal:** In addition to the points made in the preceding rebuttal; primarily, that \$20 would be a more realistic visitor party spend per day given the type of camping to which Kilkenny is referring, the “visitor party spend per day” of \$70 is then applied to visitation to Great Basin National Park to arrive at an economic value, with the implication that the Great Basin National Park would experience a total loss of visitation should the proposed groundwater withdrawals occur.

Kilkenny's presumption here must be emphasized. Kilkenny includes the total economic value of visitation (according to her own calculations) to Great Basin National Park (55,633 visitor party days and \$6.2 million in economic value), as well as

<sup>44</sup> See, <http://www.nps.gov/grba/planyourvisit/directions.htm>

<sup>45</sup> See, Las Vegas Convention and Visitors Authority and GLS Research, 2010 Visitor Profile Study, <http://www.lvcva.com/getfile/107/2010%20Las%20Vegas%20Visitor%20Profile.pdf>

<sup>46</sup> According to the Las Vegas Convention and Visitors Authority and GLS Research 2010 Visitor Profile Study, 80 percent of visitors gambled; the average gaming budget was \$466.20 among those who gambled; thus, the average gaming budget per trip for both visitors who gambled and did not gamble was 80 percent of \$466.20, or \$373. Adding \$645 and \$373, total estimated spending per trip equals \$1,018. Dividing this total by 4.6 days, total estimated spending per day equals approximately \$220.

of the Spring Valley area (40,920 visitor party days and \$4.6 million in economic value) to arrive at the total annual value of park visitation (\$10.8 million) shown in Table 1: *Summary: Market and Non-Market Value of Water in the Four Basins* (page 4 of Kilkenny's report). The \$10.8 million total is included in the \$74 million annual loss value total which serves as the principal conclusion of her report. As such, in arriving at Kilkenny's principal conclusion, Kilkenny assumes that the 75-million acre Great Basin National Park would effectively shut down and its attendance would fall to zero if the proposed groundwater withdrawals occur. Certainly this will not be the case. Furthermore, Kilkenny does not state in her report whether she considered the possibility that many of the 65,900 visitors to the Spring Valley area were the same ones included in the count of 88,870 visitors to Great Basin National Park, leading one to question whether potential "double-counting" of the economic value of a single visitor may be inflating Kilkenny's calculations.

*"In the absence of a direct survey, the non-market valuation technique known as Benefit Transfer was employed by Moeltner (2006) regarding Spring Valley." (Page 14)*

**Rebuttal:** Although Kilkenny cites Moeltner's conclusions, these citations conspicuously omit the limitations of the Benefit Transfer method cited by Moeltner himself. Among the limitations cited by Moeltner on pages 10 and 11 of his report:

- "The secondary nature of our data and the small sample size underlying our estimation impose several limitations on the accuracy and validity of our results."
- "...our analysis is based on the implicit assumption that households in Kentucky, Nebraska, etc have the same underlying preferences for wetland preservation as households in the Great Basin. This assumption is questionable given the vastly different sets of substitute wetlands and alternative recreational opportunities available to different populations around the country." [Notably, Kilkenny's report took this questionable assumption one step further, assuming that households in Reno, Las Vegas and Utah would have the same underlying preference for "wetland preservation" as households in Kentucky and Nebraska.]
- "...many of the included wetlands in our meta-regression offer richer recreational opportunities than the Spring Valley areas. This, in turn, could inflate our BT estimates."
- "In other words, we could have derived higher BT predictions for smaller wetland sizes. Naturally, this is somewhat counterintuitive. One would expect this "turning point" to occur at a much higher size level. This model flaw is a



direct result of our small sample size and our corresponding disability to include more refined quality characteristics in our specification.”

- “It should be noted though that it would be straightforward to design a primary valuation study that elicits separate benefit figures for the two areas.” (Moeltner, 2006)

Despite the limitations of his analysis, as outlined by Moeltner himself, Kilkenny used his results and failed to cite any of these limitations. Furthermore, it is notable that despite Moeltner’s suggestion (five years ago) that it would be straightforward to conduct a primary valuation for the study, Kilkenny persisted to write her own report by relying on another report that relies on a model with a “flaw” rather than conduct the recommended analysis.

*“Moeltner (2006) relied on an existing BT study valuing outdoor recreation per visitation day by Rosenberger and Loomis (2001) to estimate the economic value of these two areas. His per visitation day use-value estimate is \$42.” (Page 14)*

**Rebuttal:** Again, Kilkenny’s citation of Moeltner’s report omits important caveats – such as the fact that the model underlying the study used as a basis for his own conclusions was not designed to estimate benefits of the type Moeltner was attempting to quantify – that were emphasized by Moeltner himself. On pages 11 and 12 of Moeltner’s report, he warns that:

“In theory, a Benefit Transfer (BT) / Meta-regression approach as employed in section I of this study for Spring Valley wetlands could be used to derive a rough estimate of the economic benefits flowing from these two recreation sites to day users and campers. However, such a time-intensive approach was beyond the scope of this study. Instead, we will rely on an existing BT study on outdoor recreation to assess the economic value of these two areas. Specifically, Rosenberger and Loomis (2001), 12 [henceforth referred to as R&L] have derived benefit measures for 21 recreation activities based on 163 individual studies conducted between 1967 and 1998. This is by far the most extensive and most cited meta-dataset for outdoor recreation in the empirical economic literature. **However, it should be stressed that contrary to our Meta-Regression Model (MRM) from section I, the MRM underlying R&L’s study was not designed to estimate benefits for a specific site or policy context.** [Emphasis added.] Instead, R&L’s aim was to use a single model to predict economic values for a large set of outdoor activities. Their meta-data include extremely diverse outdoor destinations with vastly different sets of substitutes available to the underlying population of visitors – from national ‘flagship’ sites such as the Grand Canyon or Yosemite, to State Parks and rest

stops of regional or local importance. This breadth of destination types and this high level of generality of analysis are convenient when the primary research objective is to generate nationally representative estimates for each activity for the 'prototypical U.S. site and visitor', as was the case for the R&L study. The drawback of this approach is that the model is less well suited to generate BT predictions for any specific destination or visitor group." (Moeltner, 2006)

Moreover, Kilkenny appears to assign two values to the visitors of Cleve Creek: one value represents the value of the individual's visit to the recreational area, and one value represents the value of the recreational area visit to the visitor. This appears to result in double counting of the determined impact. Such a process would be akin to calculating the total economic impact of the 39 million annual visitors to Las Vegas by adding the amount that they spend in Las Vegas and the value that the visitor placed on his or her trip to Las Vegas.

Specifically, page 11 notes that the Bureau of Land Management reported 65,900 visitors at Cleve Creek between October 1, 2004 and September 30, 2005, and assigns these 40,920 (100 of which are derived from Mt. Moriah Wilderness) visitor party days a value of \$70 each based on their "per day" spending (\$4.5 million total value). On page 14, Kilkenny states that Moeltner reported that according to the Ely BLM office, Cleve Creek received 5,723 visitation days in the first nine months of 2006, and assigns each visitation day a value of between \$6 and \$42 attributable to the economic value of the activity of picnicking or camping (\$35,000 to \$254,000 per year, according to Moeltner). It is unclear whether Moeltner assigns the economic value of picnicking to the visitor or to the area, but the Rosenberger and Loomis (2001) study upon which he based his \$42 value of picnicking or camping was designed to measure consumer surplus (the value of a recreation activity beyond what must be paid to enjoy it). Nevertheless, Kilkenny utilizes Moeltner's high-end estimate of \$42 (rather than something between the \$6 and \$42 range provided by Moeltner) and calculates the non-market use value of visitors to Cleve Creek to be \$240,000 annually. These assumptions call into question the accuracy and validity of Kilkenny's analysis.

Kilkenny fails to explain the disparity within her own report as well as between her own report and Moeltner's regarding the visitation count for Cleve Creek (6,000 visitation days<sup>47</sup> versus 65,000 visitors<sup>48</sup> (40,920 visitation days minus 100 for Mt. Moriah)), and at the time of this rebuttal report, AA was unable to locate official visitor counts to Cleve Creek in 2006. According to various camping websites, Cleve Creek campground consists of 8 campsites. Even if all 8 were occupied 365 days per

<sup>47</sup> See, Kilkenny, page 14 and Moeltner, pages 11-12

<sup>48</sup> See, Kilkenny, page 11

year, which is extremely unlikely, 100 percent occupancy would equate to 2,920 camping nights.

In addition, on page 12, Moeltner states: "Using approximated annual visitation counts (in visitor-days) of 6,000 for CCCG and 12,000 for SPRA (extrapolating the BLM October estimates to a 12 month period)...." In many economic analyses, a researcher will utilize figures from months in the preceding year to arrive at a rolling-twelve month total if annual data is required, rather than "extrapolating the...October estimates to a 12 month period" to avoid potential inaccurate extrapolation of the data due to seasonal fluctuations. Kilkenny failed to point out this limitation. AA was unable to access the same data for 2005 and 2006 at the date of this report to verify that Moeltner's counts were not flawed due to the seasonality of outdoor recreation.

## Rebuttal of Moeltner Report

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Moeltner's report is entitled "An Estimation of the Non-Market Economic Value of Wetland Habitats and Recreation Sites in the Spring Valley, NV, Basin Using Secondary Data Sources," and its introduction states that it builds on secondary information reported in existing wetland valuation studies to estimate the economic value of the Spring Valley wetlands. This rebuttal report addresses a number of statements made by Moeltner. Statements from Moeltner's report that are rebutted are provided, followed by analysis of each citation. Note that citations from Moeltner's report are generally printed in italics to easily distinguish them from rebuttal remarks.

We noted that Moeltner included a number of limitations in his report, and he stressed that his secondary approach could not fully substitute for thorough primary data collection and research. While Moeltner was careful to include a thorough description of caveats and limitations throughout his report, as noted in the Kilkenny rebuttal above, Kilkenny omitted any mention of these limitations, not even cautioning a reader to refer to Moeltner's report for a discussion of limitations. Such a conspicuous omission calls into question the completeness and credibility of Kilkenny's expert opinion.

*"This, in turn, enables analysts and policymakers to compare these non-market benefits to policy costs and other economic figures in a broader benefit-cost-analytical framework." (Page 4)*

**Rebuttal:** On page 4 of his report, Moeltner notes that the concept of "resource valuation" and "benefit transfer" allow policymakers to turn latent non-market values of environmental resources into actual currency. However, while Moeltner outlines the existing "economic benefits" that visitors derive when they engage in either picnicking or camping at the Swamp Cedar Natural Area and Shoshone Ponds Natural Area, he does not consider the benefits of using the groundwater at issue in this matter for alternative uses. Consideration of alternative uses would be necessary to enable policymakers to compare the respective values of the use of this water. Additionally, Moeltner's analysis seems to presume that the economic value that these areas provide to visitors who come to picnic and camp within their bounds will terminate in the event the proposed groundwater transfers take place. However, Moeltner himself notes that in the event wetland services are terminated, it will be a "continuous, dynamic process, with gradual replacement of existing ecosystems by others" (page 10).

*"First, the researcher must identify existing studies that have estimated the economic value of natural resources similar to the one in question (aka the "policy site"), ideally for a similar underlying population of stakeholders. These*

*existing sources may include traditional outlets such as journal publications and book chapters, but should also explore the "gray literature" consisting of government reports, departmental working papers, theses and dissertations, and other types of informal publications. In each case, the researcher must use good judgment to decide if the primary analysis underlying these original sources satisfies the dual requirements of "similarity to the policy context of interest" and "scientific rigor and credibility." (Page 6)*

**Comment:** This rebuttal statement is directed towards Kilkenny's report in relation to its lack of consideration of the limitations of Moeltner's report. With respect to the use of Moeltner's report itself, it does not appear that any additional relevant studies were conducted despite Moeltner's caution that a primary study would be warranted. Kilkenny's report places heavy reliance on Moeltner's foundation without doing the additional research that he calls for as a basic element of any non-market analysis.

*"This "first cut" approach produced a set of 24 initial candidate studies. Given the nature of their primary valuation objectives (habitat and biodiversity services, recreational opportunities) all of these sources use survey-based approaches to elicit households' willingness-to-pay (WTP) to preserve or expand a specific existing wetland area." (Page 6)*

**Rebuttal:** It is notable that of the final nine studies deemed "suitable for the research context at hand" (Moeltner, page 6) none was conducted for wetlands in Nevada or Utah or relative to the proposed SNWA project. Wetlands considered "similar areas" and making it to Moeltner's "final cut" included: two studies on wetlands in the San Joaquin Valley, California from 1989; two studies on wetlands in western Kentucky from 1989 and 1990; a study on wetlands in Wisconsin in 1994; a study on a wetland area on the Minnesota/South Dakota border in 1996; a study on the Rainwater Basin Wetlands in Nebraska in 1996; a study of the Alfred Bog in Ontario, Canada in 2001; and a study on the Canaan Valley National Wildlife Refuge in 1996. For this and other reasons cited throughout this rebuttal report, applying the survey results to the wetlands in Spring Valley was inappropriate, despite his efforts to provide detailed explanation of the caveats and limitations of his analysis.

*"For example, under the two-year desiccation scenario (Scen. 1) and the full 70-year horizon, we estimate a loss of over \$32 million to Nevada alone, and \$70 million to Nevada and Utah combined. For Scenario 2, under which we stipulate no losses for the first 20 years after project initiation, the discounted 70-year losses are \$19 million for Nevada, and \$41.5 million for Nevada plus Utah." (Page 10)*

**Rebuttal:** It is unclear why the Nevada State Engineer would be concerned about the non-use market value of resources in Nevada that Utah residents who are not

expected to visit or see the resource would place on it. Notably, Kilkenny includes the market value of non-use for Utah residents (\$38 million 70-year value) as calculated by Moeltner, which is actually larger than the market value of non-use for Nevada residents (\$32 million 70-year value) in her report. To avoid confusion, it should be noted that \$38 million and \$32 million totals to \$70 million, but Kilkenny cites the highest value given for this non-market valuation in Moeltner's report, which is \$74 million and is shown in Table 1 of Moeltner's report.

*"Not surprisingly given the diversity of studies and recreation sites included in R&L, the 95% confidence intervals for these estimates, also shown in Table 6, are extremely wide. For example, the true value of a day of camping to the prototypical recreationist at a given location may be as low as \$2.2, and as high as \$250." (Page 12)*

*"The resulting figures are captured in Table 7. As depicted in the upper section of the table, our per-person and visitation day point estimate is approximately \$42, with corresponding lower and upper bounds of \$6 and \$202, respectively." (Page 12)*

**Rebuttal:** In both of these instances, Moeltner's caveats regarding the extremely wide ranges of values across studies should not be discounted. These ranges (\$2.20 to \$250 or \$6 to \$202) are so wide that it could be argued that any such reliance on them lacks meaningful relevance. Concern regarding the extremely wide value ranges places substantial doubt on the validity of the analysis and underscores Moeltner's own contention that additional research is warranted. Notwithstanding the fact that the limitations of Moeltner's methodology are clearly stated in his report, the challenges of having small sample sizes are evident.

*"Expressing the associated economic losses to society in dollars would be best accomplished by a primary non-market type economic valuation study for these lands. To date, such a study has not yet been conducted." (Page 13)*

**Rebuttal:** Moeltner's conclusion that more study to quantify non-market values of the areas included in his report is needed stands in stark contrast to Kilkenny's concluding statement, which presents all estimated economic impacts as definitive; and, in fact an "underestimate of the values at risk for many reasons" (Kilkenny page 17).

That said, despite the limitations discussed throughout his report, Moeltner offers quantified economic values, even though he admits that the study required to quantify these dollars "has not yet been conducted." This calls into question any reliance on dollar values quantified in Moeltner's report for any purpose.

## Conclusion

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In conclusion, both Kilkenny's and Moeltner's reports are flawed for three primary reasons: 1) they rely on an incorrect foundational assertion that the proposed water withdrawals will have devastating environmental impacts throughout White Pine and Lincoln counties; 2) Kilkenny in particular uses aggressive and often inappropriate assumptions, failing even to differentiate between jobs with and without a rational nexus to the water resources at issue; and 3) neither Kilkenny nor Moeltner consider the alternative use value of the 128,000 acre feet of water in question. For these and the other reasons outlined throughout this rebuttal report, the State Engineer should not rely on the work product, analyses or conclusion in either of the studies reviewed.