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FAX COVER

TO: Ms. Penny Woods FAX: 775 861 6689
FROM: Steve Reich JOB NO.: 3066
DATE: Oct 11, 2011 TIME: 3:30 PDT
RE: Comments to BLM Draft EIS

Number of pages to follow: 13

Ms Woods,

Enclosed are comments to the BLM's Draft EIS for the Groundwater Development Project in Clark, Lincoln, and White Pine Counties. I also submitted identical comments via email.

Thank you for considering our comments submitted on behalf of The Long Now Foundation.

Steve Reich

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Northern California • Southern California • New Mexico • Arizona • Nevada • Colorado

October 10, 2011

Reply to: San Rafael

Ms. Penny Woods
Project Manager
BLM Nevada Groundwater Projects Office
P.O. Box 12000
Reno, NV 89520

Re: Comments on Draft EIS - Clark, Lincoln, and White Pine Counties Groundwater Development Project

Dear Ms. Woods:

Stetson Engineers Inc. has reviewed sections of the Draft EIS – Clark, Lincoln, and White Pine Counties Groundwater Development Project (Draft EIS) and would like to submit the attached comments on behalf of The Long Now Foundation. Our review focuses primarily on potential environmental impacts from the proposed project that may affect air quality, soils, and related resources. As discussed in detail below and in the attached comment matrix, the Draft EIS fails to consider publically available soil and plant data from eastern Nevada. It is likely that alternative conclusions and mitigation measures would have resulted from the environmental analysis if these datasets had been considered during development of the Draft EIS. C1

Soil surveys prepared by the Natural Resources Conservation Service (NRCS) is one of the best sources of information that can be utilized in evaluating project impacts that may result from the predicted decline in groundwater levels. The NRCS soil survey information is readily available on-line; it is extensive, comprehensive, site-specific, and is probably the most reliable data source available regarding soil and associated vegetation conditions in eastern Nevada. Review of the Draft EIS indicates that the NRCS data was not appropriately utilized or considered during environmental review of the proposed project. C2

Considerable research in defining the dust generation from playas, and the physical factors that cause dust to become airborne, has been performed and documented. In addition to publically available data in the project area, additional baseline soils data should be collected and analyzed for dust generation before the Draft EIS is finalized. The enclosed comments provide recommendations for collecting these baseline data in playa areas so that reasonable evaluations can be drawn regarding the effects of groundwater level drawdown on dust generation. C3

C4 The Draft EIS also fails to adequately address the effect of groundwater pumping on wetlands in the project area. Sufficient data from the NRCS exists to reasonably predict the effects to the environment; however, the actual impacts will likely differ greatly from those presented in the Draft EIS since these data were also not considered. Based on our review, it is estimated that approximately 14,400 acres of wetlands in the survey area will be eliminated and converted to drier sites due to a groundwater level decline of 10 feet. The groundwater level drawdown will effectively eliminate the anaerobic soil conditions required for wetlands. Similar to the impact analysis of dust generation from the playa due to the proposed project, the conversion of these ecosystems has not been properly addressed in the Draft EIS. It is likely that existing wetlands in Spring Valley will be converted to dry meadows, or dry saline meadows, with a 30% to 85% reduction in biomass production and a 20% to 60% reduction in soil cover. These changes will increase the potential for erosion, surface water quality degradation, downstream flooding, and result in a decrease of basin aquifer recharge.

C5

The project's predicted groundwater level decline will cause a decrease in vegetative production and plant cover that results in a shift of species composition within the project area currently supporting phreatophytes. These changes will leave more soil surface area exposed, increasing the potential for wind and water erosion. Although there is existing data to conduct an evaluation to phreatophytes, environmental impacts to plant species have not been adequately addressed in the Draft EIS.

C6

Thank you for your time in reviewing the attached comments to the Draft EIS. Please contact me at (415) 457-0701 if you have any questions regarding these comments.

Sincerely,

Stephen Reich, P.E.
Senior Supervising Engineer

Enclosed: (1) Comments on Draft EIS

Subject: Comments on Draft EIS - Clark, Lincoln, and White Pine Counties Groundwater Development Project

#	Page	Line/Para/Sec	Comment
1	3.1-33	3.1.2.8 Groundwater Pumping - Playas	The section regarding windblown dust emissions from groundwater drawdown states that "It is assumed that the soil binding properties of [playas] would not change as a result of groundwater drawdown. It is assumed that windblown dust from playa surfaces would remain at baseline levels." This assumption is in error. Research and mitigation practice at Owens Lake, CA, and in other locales has shown that water serves as a primary binding agent for soils. Groundwater drawdown and the resultant desiccation of the soils will likely have some impacts upon the playa soils. Impacts cannot be assumed away in this manner, thereby removing this "ET unit" from further consideration of windblown dust emissions.
2	3.1-34	3.1.2.8 Groundwater Pumping- Phreatophyte/ medium vegetation	The prediction that soils in areas of phreatophytes will remain bound "continuously" by living and dead root systems is likely erroneous. More likely is that some portions of this ET unit will develop dry saline wetland conditions and barren soil conditions as the areas undergo altered hydrology and changes in species composition.
3	3.1-34	3.1.2.8 Groundwater Pumping - Wetland/ meadow	The prediction that soils in areas of wetlands and meadows, which are defined by hydrology, will remain bound and not change is likely erroneous. More likely is that some portions of this ET unit will develop bare areas and "salt spots." The change to drought tolerant vegetation is also likely to be accompanied by alterations in soil conditions that affect the soils' propensity to yield windblown dust. The section states that "None of the surface area composed of this ET unit would be susceptible to wind erosion." Impacts cannot be assumed away in this manner, thereby removing this "ET unit" from further consideration of windblown dust emissions.
4	3.1-34	3.1.2.8 Groundwater Pumping - Wetland/ meadow	The Draft EIS notes the potential for morphological changes in color and ferrous iron content to "at risk" hydric soils, those that may be morphologically altered by drawdown. Further, it states that lack of intermittent saturation might eventually change the plant community supported, as well as cause the soil to no longer meet hydric criteria. Though these statements are true, they fail to recognize the full extent of the impact of a change in the water table depth. The physical changes to the soil are much less important than the changes to the vegetation and ecosystems. Further, the Draft EIS (BLM, 2011) states on page 3.1-34 that: Wetland/meadow: It is predicted that this cover type may change in species composition toward a greater fraction of shrubs and drought tolerant grasses and forbs. It is assumed that the soil binding properties of this cover type would not change, even though species composition may change. None of the surface area composed of this ET unit would be susceptible to wind erosion.

C7 C8 C9 C10 C11

C12				Wetlands are much more insulated to wind erosion than "drought tolerant grasses and forbs". When one also takes into account the changes in soil chemical properties (especially salinity), the statement in the Draft EIS is much too general. The following information about ecosites, biomass production, and cover are taken from the soil survey of White Pine County, Eastern Part (Soil Survey Staff, 2007, 2011b), NRCS Ecosite Descriptions (USDA-NRCS, 2011a), and McLendon (2011). A 10-ft drop in the water table depth would transition all wetlands and wet meadows at least to dry meadows. This would result in at least 35% reductions in biomass production, with a concomitant 20 to 35% decrease in cover. The salinity and sodicity characteristics of some of the wetlands and wet meadow soils might shift the transitions to dry saline meadows, resulting in an 80% decrease in biomass and 40 to 50% reduction in cover. All wet saline meadows, saline bottoms and saline meadows would likely transition to dry saline meadows, with 60 to 85% decreases in biomass, and 40 to 60% reduction in cover. The additional exposed soil surfaces would be subject to wind and water erosion. As the grass cover decreases, phreatophytic shrubs might invade, causing transition away from meadow (grass-dominated) to shrub-dominated communities. McLendon concludes "productivity and plant cover may decrease" due to a 10-ft decrease in the water table, which is in direct opposition to the Draft EIS report that "overall plant cover would likely remain similar to baseline conditions over time" (p. 3.4-32, BLM 2011). This statement contradicts the Draft EIS discussion of Phase 3 in the vegetation chapter, "Bare interspaces among shrubs would increase and some of these interspaces could be invaded by annual native and exotic species" (p. 3.5-40, BLM 2011).
C13				
C14	5	3.1-34	3.1.2.9 Proposed Action	This paragraph states that "The major effect of future groundwater field development would be an expansion of surface disturbance activities over a large area within each hydrographic basin." For the reasons discussed in the preceding 3 comments, this disturbed area is likely to be larger than is characterized within this Draft EIS.
C15	6	3.1-36 through 3.1-45	Tables 3.1-15 through 3.1-20	The estimated increases in windblown dust in Tables 3.1-15 through 3.1-20 do not include those associated with changes in playas and wetlands/meadows as discussed in the preceding comments. The total emissions are likely to be higher than reflected in these tables.
C16	7	3.1-37	3.1.2.9 GE-AQ-3 Monitoring, Mitigation, and Management Plan for Air Quality	The Monitoring, Mitigation, and Management Plan for Air Quality discusses locating monitoring stations in bare soil/ sparse vegetation ET units, "which has the greatest potential for windblown dust impacts." The monitoring program should carefully consider siting in a location to sample potential windblown dust from playas as discussed in preceding comments. Windblown dust from playas has proven to be a major issue at Owens Lake, California, and this potentiality should not be assumed away in the Draft EIS study area.

C17				The magnitude of the mitigation costs associated with suppressing fugitive dust emissions at Owens Lake, and the resultant extraordinary mitigation costs were not foreseen in the early years of the Los Angeles Department of Water and Power water project. Lessons learned at other water development projects may aid in the development of potential mitigation requirements associated with groundwater development and exportation in eastern Nevada. These requirements and costs should be factored into decisions relating to the feasibility, value, and potential economic costs of the proposed project.
C18				The LADWP operates its groundwater production program in accordance with a 1997 Owens Valley Memorandum of Understanding between LADWP and Inyo County (LADWP, 2010). The required mitigation includes extensive monitoring of hydrology, condition of vegetation and dust generation. The mitigation also includes a series of projects such as revegetation with native flora, reinstatement of river flows, water augmentation for ponds, surface spreading of water, pasture irrigation, maintenance of waterfowl habitat, and measures to suppress fugitive dust (PM-10) generation (LADWP, 2010). The California Air Resources Board and the Great Basin Unified Air Pollution Control District require that LADWP control the fugitive dust. Techniques tested include sand fences, chemicals, covering the lake with old tires, as well as a proposal to pump treated sewage from Los Angeles. The methods that worked best were shallow flooding, vegetation, and gravel (Anderson, 2006). Based on a review of publically available references, capital expenditures for the Owens Lake Mitigation project as of 2011 are approximately $540 million and yearly recurring costs range between $41-66 million. While a direct relationship should not be inferred between what occurred at Owens Lake and what may occur due to the proposed project, it is important to address the potential for expensive, long term mitigation of windblown dust.
C19	8	3.1-39	3.1.2.10 Alternative A - Groundwater Pumping	The Conclusion states that "it is possible that windblown dust emissions from groundwater drawdown could impair visibility conditions at GBNP. The extent of possible visibility impairment is highly uncertain." The analysis of impacts upon GBNP should incorporate estimates of windblown dust emissions originating from impacted playas and wetlands/meadows as discussed in previous comments. This concern also pertains to the analysis of the other alternatives, as well.
C20	9	3.1-48	3.1.2.16 - Alternatives Comparison	For the reasons listed in the preceding comments, the discussion of overall air quality impacts and the figures contained in Tables 3.1-22 and 3.1-23 underestimate windblown dust emissions generated as a

Subject: Comments on Draft EIS - Clark, Lincoln, and White Pine Counties Groundwater Development Project

C20 cont'd				result of the project.
C21	10	3.1-57	3.1.4. - Cumulative Impacts	The analysis of cumulative impacts does not include consideration of windblown dust emissions generated by disturbance to playas and wetlands/meadows.
C22	11	3.1-57	3.1.4. - Cumulative Impacts	The analysis should consider the potential for impact by wind-blown desert soils on duration of mountain snow cover in GBNP as well as other mountains in Nevada and Utah. Mountain snow cover is a critical resource as these high elevation mountain regions provide the majority of fresh water supply in arid and semi-arid environments. It is well known that dust in snow enhances absorbed solar radiation and melt rates. Painter et al. (2007) and Kedrowski and Toomer (2010), provide relevant analyses of the impacts of dust upon snow cover duration in a seasonally snow covered mountain range.
C23	12	3.1-57	3.1.4. - Cumulative Impacts	The analysis of affected soils generating windblown dust is limited to those locations projected to have at least a 10' groundwater drawdown. This constraint upon the analysis discounts potential impacts to soil moisture and associated binding properties and dust generation for locations within groundwater drawdown of less than 10 feet. This limitation upon the analysis appears to be imposed throughout the Air Quality section.
C24	13	3.1-59 throug h 3.1-66	Tables 3.1-25 through 3.1-30	The estimated increases in windblown dust in Tables 3.1-25 through 3.1-30 do not include those associated with changes in playas and wetlands/meadows as discussed in the previous comments. The total emissions are likely to be higher than reflected in these tables.
C25	14	3.1-68	3.1.4.10 - Cumulative Impacts - No Action	This section states that "at current levels of groundwater pumping and the addition of other projects, there would be an increase in current levels of windblown dust generation due to changes in vegetation and groundcover." It seems inappropriate to assume some unplanned future projects (as part of No Action) that would cause changes in vegetation and soil conditions.... and then compare such changes to the Proposed Action and alternatives being considered by this Draft EIS. Rather, the No Action alternative should reflect no action. The project proponent should not set up a set of undefined "straw man" projects that are assumed also to negatively affect the study area, and then compare this set against the Proposed Action.
C26	15	3.4.1	Affected Environment	One of the best sources of information that can be utilized in evaluating project impacts is the soil surveys prepared by the Natural Resources Conservation Service. It is evident that this resource was not appropriately utilized, and that considerable existing information on the site conditions of the Spring Valley lands was available which, if properly used, would have resulted in conclusions far different from those presented in the Draft EIS. It is not clear why this information was not used. The NRCS soil survey information is readily available on-line; it is extensive, comprehensive, site-specific, and is probably the most reliable data source available regarding soil and associated vegetation conditions.

16	3.4.2	Environmental Consequences	The NRCS soil survey (which is the best resource information available for this area) does not characterize the soil conditions present in the playas. The only details included in the report regarding playas are (1) depth to groundwater and overflow potential and (2) general soil stratigraphy. This information is insufficient to make meaningful predictions regarding the site-specific effects of groundwater drawdown, or to evaluate the environmental impacts or mitigation requirements. Nevertheless, there are indications as to the general conditions that likely exist and these indications are sufficient to conclude that the adverse environmental consequences of groundwater withdrawal could be significant. From the NRCS soil survey, we know that these areas are dominantly wet, and often ponded. It is common throughout this region, and is obvious from examination of aerial photos, that most of these playas have salt crusts of varying thickness. Other sources of information support this, along with bits of added information. Spring Valley is located in the NRCS Major Land Resource Area (MLRA) identified as Great Salt Lake Area (28A). Their general description of the playa areas within MLRA 28A states: 1. Most of the valleys in this MLRA are closed basins containing sinks or playa lakes. 2. Poorly drained Aquisalids occur in basin floors. (Aquisalids is the taxonomic classification of soils that have wet soil conditions and high levels of salt.) 3. The text discussion includes references to a particularly large "salty playa" in the area. C27 It is reasonable to conclude, in the absence of more site-specific information, that these playas are salt-encrusted wet areas that in many instances are frequently ponded. It should be noted that this is in strong contrast to the assumption stated in the BLM Draft EIS, which is presented on page 3.1-33: "Playas: It is assumed that the soil binding properties of this cover type would not change as a result of groundwater drawdown. It is assumed that windblown dust from playa surfaces would remain at baseline levels." This simple and single statement summarizes the conclusion reached in the Draft EIS. The statement that soil binding properties (the most important of which is moisture) would not change is without substance or support from any authoritative source. The logical assumption that follows states that "it is assumed that windblown dust from playa surfaces would remain at baseline levels" is likewise unsupportable and without foundation. Although it cannot be concluded that the conditions in the playas of Spring Valley are similar to those in Owens Lakebed in California, the studies done at Owens Lake are a valuable resource in the management

			of saline playas. For example, it is recognized in the Owens Lake area that soil moisture is a prime soil-binder in salt crusts to prevent dust generation. As a matter of fact, shallow flooding (keeping the salt crust/soil moist to the surface) is a major mitigation practice employed on Owens Lakebed. It is also recognized that the chemical composition of the salt crust significantly affects the potential for dust generation, wherein sodium salts tend to be "fluffy", fine-grained, and easily airborne and calcium salts tend to be more stable. In all likelihood, both kinds of salt will occur in the various playas throughout Spring Valley. In Spring Valley, when these salt-encrusted playas become dry the binding quality provided by moisture will be lost. Depending upon the specific chemistry of the salts, thickness of the crusts, and other factors, these crusts may then become powdery and may be air-borne, especially during the windy season of the year. Given that the area of playas in the White Pine County Nevada, East Part alone is 16,996 acres, the risk of drying these areas by dropping the water table is obvious. Other recent studies support the conclusion that dust generation from drained playas in Spring Valley is likely. Playas that are close to the groundwater level have been found to be seasonally susceptible to wind erosion within the southwestern U.S. (Gill, 1996; Pelletier, 2006; Reynolds, et al., 2007), and quick exposure of larger areas (such as the case of Owens Lake) can, without proper mitigation, lead to severe dust emissions. At the Salton Sea, soft crusts were found to be significant producers of dust during winter and early spring, as were dry wash areas containing loose particles on the surface year-round. The removal of fluffed salts by wind erosion facilitates the bare soil to continue salt formation on the soil surface.
17	3.4.2	Environmental Consequences	Per NRCS data, an estimated 16,996 acres of playas occur within that portion of the project area included in the White Pine County Nevada East Part. This is only a portion of the project area, and playas are much more extensive in the total area. Considerable research in defining the processes involved in dust generation from playas has been done, and many site factors that cause dust to become airborne have been identified. Determinations of impacts require adequate baseline information, and this information does not exist for the playa areas. The following site-specific data, at a minimum, are needed on the playa areas to make reasonable evaluations regarding the effects of groundwater drawdown: 1. Ponding frequency and current depth to water table. 2. Depth of water table after project development (predicted). 3. Soil stratigraphy to a depth of six feet. 4. Thickness and chemical composition of salt crusts.

				5. Soil chemical composition (especially soluble salt content) 6. Location and extent of the various conditions that occur (soil map). It is practical to gather this baseline information. Current methodologies employed by the NRCS and many natural resource consulting firms are adequate to characterize these areas. The costs of gathering the required information are nominal, especially considering the size and long-term effects of this project. Information would need to be gathered only on the playa areas, as the soil information already published by the NRCS is sufficient for evaluating soil issues on non-playa areas. Once the baseline information regarding the playas is available, impacts could be appropriately determined and plans could be developed so that environmental consequences could be minimized through timely mitigation practices.
C28	18	3.3	Water Resources	The EIS only addressed potential impacts to wetlands in terms of declining water tables on vegetation and aquatic biological resources, with no mention of the role of wetlands in protecting the environment, shallow aquifer recharge, flood mitigation, and surface water quality. No discussion of the natural filtering processes and environmental role of wetlands ecosystems is included. Decreasing vegetation will decrease filtering of sediments during runoff events, resulting in more sediment transport, silting-in streams and waterways when deposition occurs. Many organic and inorganic compounds are removed as water passes through wetlands. Constructed wetlands have been used to clean effluent from concentrated animal feeding operations to EPA standards for release into surface waters. Only groundwater quality is addressed in the Draft EIS; surface water quality is not. Loss of wetlands will result in surface water quality degradation. Dense wetland vegetation slows water velocity in channels during runoff events. If vegetation density decreases due to groundwater drawdown, downstream flooding is more likely, and less aquifer recharge will occur as the residence time in the recharge area is decreased. Sufficient information exists (primarily in the soil survey report) to reasonably predict the effects of drawdown upon wetland areas within the project, however the actual impacts will likely differ greatly from those presented in the BLM Draft EIS. It is estimated that, based upon the assumed groundwater drawdown of 10 feet, all of the 14,419 acres of wetlands in the survey area will be eliminated and converted to drier sites (see Table 1 for conversion predictions). The drawdown of groundwater by 10 feet will effectively eliminate the anaerobic soil conditions required for wetlands. The results of these ecosystem conversions have not been properly addressed.

C29

			One of the ACMs intended to assist with the vegetative transition is large-scale seeding. However, large-scale seeding in arid and semiarid regions, without irrigation or timely precipitation, has little record of success (Gaus, 2010). It is our opinion that existing wetlands in Spring Valley will be converted to dry meadows or dry saline meadows, with 30 to 85% reductions in biomass production and 20 to 60% reductions in soil cover. These changes will increase the potential for erosion, surface water quality degradation, downstream flooding, and decrease basin aquifer recharge.
19	3.4 and 3.5	Soils and Vegetation Resources	Apart from wetlands, obligate and facultative phreatophytes are present on at least 145,810 acres on thirteen ecosites in the White Pine County Nevada East Part Soil Survey Area. As previously indicated, there are a total of twelve other soil survey areas within the groundwater project area, so the total acreage of phreatophytes is much larger than 145,810 acres. The following information about ecosites, biomass production, and cover are taken from the soil survey of White Pine County, Eastern Part (Soil Survey Staff, 2007, 2011b), NRCS Ecosite Descriptions (USDA-NRCS, 2011a), and McLendon (2011). Eight of the ecosites have water tables between 1 and 5 feet all year. These are grass-dominated meadows that produce 400 to 1500 lbs/ac. If the water table drops 10 feet, the grass component of the vegetation will decrease, and shrubs may increase or invade. Due to the reduced water availability to support plant growth, it was assumed that biomass production would approximate that of an unfavorable year, and will decrease about 40% on sodic ecosites, and about 30% on saline and other ecosites. These reductions in biomass likely would result in 20 to 30% reductions in soil cover. C30 The Draft EIS does not address the potential impact of salinization on the vegetative community as the water table declines. If soil salinity increases as the water table declines, biomass production may decrease as much as 70 to 95%, with concomitant decreases in surface cover. Salts are common in these soils, so this is a likely scenario. While the water table is near the surface, capillary fringe draws water to the surface, bringing salts with it. As the water table drops, upward movement of salts will diminish. However, there will be little to no water moving down into the soil to leach the salts downward. Increased salt content at the soil surface will decrease germination and establishment of plants. This is a factor that would limit effectiveness of large-scale seeding (ACM C.2.5).

			McLendon (2011) provides an excellent discussion of the likely succession that will occur with the change in depth to water. Patten et al (2008) predict a reduction in upland phreatophytic vegetation as the groundwater level drops below the root zone due to pumping and the interconnected nature of the basin-fill aquifer and the carbonate rock aquifer system. Manning (1999) noted that phreatophytic shrub communities in Owens Valley might represent end-succession communities which further disturbance or stress might convert to bare, weedy land. All these information sources contradict the conclusion of the Draft EIS (Chapter 3, Page 3.4-21): Based on a literature review of phreatophytic vegetation responses to groundwater drawdown (Section 3.5), it is expected that there would be changes in species composition, but overall plant cover would likely remain similar to baseline conditions over time. Therefore, it is unlikely that there would be an increase in soil erosion due to decreases in hydric soils and associated changes in plant communities. The maintenance of a relatively constant plant canopy cover and soil stabilization by plant roots may vary from place to place, depending on the soil chemistry and texture, alterations of soil biological and physical crusts, and the proximity of seed sources of plants that are adapted to changing soil moisture conditions.
C31			It is our opinion there will be a decrease in vegetative production and plant cover that accompanies the shift in species composition on much of the area currently supporting phreatophytes. These changes will leave more soil surface area exposed, increasing the potential for wind and water erosion. These effects have not been fully evaluated in the Draft EIS. Current information is likely sufficient to make a reasonable evaluation of the effects of the project.

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