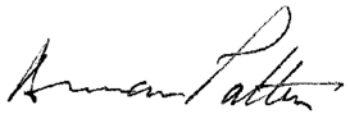
Comments on Select SNWA Documents Submitted as Evidence July 1, 2011 and BLM DEIS Relative to Vegetation Dynamics and Groundwater Levels

Submitted by Duncan T. Patten, August 24, 2011



The following is a brief review of salient evidence concerning vegetation dynamics and groundwater levels in SNWA's July 1, 2011, evidentiary submission and the Draft Environmental Impact Statement (EIS) published on June 10, 2011. The most comprehensive and specific document on vegetation dynamics submitted by SNWA is the report by Terry McLendon (KS2 Ecological Field Services). This report documents the various biomes found in the Spring Valley area and discusses potential successional changes that would take place within the plant associations composing these biomes if depth to water were to increase. The successional changes in most examples go from species that either require or do better with a shallow water table to species that can tolerate a deep water table or no available groundwater.

McLendon concludes that these successional changes creating new plant associations would be manageable and that "[t]he rate and magnitude of groundwater decline can be managed such that successional processes will result in target plant communities associated with specific DTW (depth to water) and soil conditions." This implies that "target plant communities" are acceptable. This may be the case for shifts in shrub communities from Greasewood to Big Sagebrush, but it does not seem acceptable, or environmentally sound, for changes in wetland communities which will transition from obligate wetland species to facultative wetland species or perhaps facultative species In most geographic regions of the USA wetland communities are highly valued and protected both locally and by federal law (e.g., Clean Water Act). In the arid West, scarce wetlands are even more prized and important to support diverse wildlife communities and endemic species.

In some cases the effect of water table decline on wetland communities will be a loss of the actual wetland in addition to reduction in area of wetland if spring outflow (i.e., spring brook) that supports wetlands is truncated by groundwater withdrawal (see Patten et al. 2008). Patten et al. (2008) also demonstrate through simple linear models based on vegetation and associated water table sampling that small changes in depth to the water table may alter the wetland indicator score status of the plant community. McLendon's diagrams support this possible change where one diagram (and associated text) dealing with wetlands shows a distinct shift in species composition with less than a 1m decline in depth to water, whereas declines of several meters would be required to make major shifts in upland phreatophytic plant composition. Naumberg et al. (2005) discuss and diagram the several pathways that would cause changes in phreatophyte community composition, however, these pathways do not apply to wetland

communities or wetland/upland transition communities which generally do not support phreatophytic plant species.

Although McLendon has presented a comprehensive discussion of the many possible shifts in plant community composition associated with a declining water table, it seems inappropriate to accept these changes under the assumption that vegetation succession and development of "new" or substitute plant communities resulting from a decline of the water table is "manageable" and therefore, by implication, acceptable. Accepting major changes in, or losses of, existing plant communities is tantamount to accepting potentially major alterations of the long established ecological dynamics of this area of the Great Basin.

The BLM DEIS also discusses potential changes in vegetation cover in the areas where there will be water table declines resulting from SNWA groundwater withdrawal. Unfortunately, the BLM discussion on water table decline effects is related primarily to a 10 foot (ca. 3m) decline. If one uses the model for Spring Valley developed by Patten, et al. (2008), or refers to the several figures on changes from water table decline in the McLendon report, they will find that there are many significant changes in plant species composition resulting from smaller water table declines than 10 ft (3m).

As noted above, the changes in plant communities that McLendon acknowledges are likely should not be assumed to be acceptable or environmentally sound, especially in sensitive plant communities such as wetlands and the often associated aquatic plant communities. In addition, it is important to understand that water table declines of much less than 10 ft can have significant effects on many plant species, and therefore it would be inappropriate to limit consideration of effects on plants only to those associated with a 10 ft or greater decline.

References:

Bureau of Land Management. June 2011. Draft Environmental Impact Statement (EIS): SNWA's Clark, Lincoln, White Pine Counties Groundwater Development Project.

Naumburg E, R. Mata-Gonzales, RG Hunter, T. McLendon, DW Martin. 2005. Phreatophytic vegetation and groundwater fluctuations: a review of current research and application of ecosystem response modeling with an emphasis on Great Basin vegetation. Environmental Management 35:726–740.

Patten, D.T., L. Rouse, and J.C. Stromberg. 2008. Isolated spring wetlands in the Great Basin and Mojave Deserts, U.S.A.: Potential response of vegetation to groundwater withdrawal. Environmental Management 41(3): 398-413.