

The Effect of Groundwater Pumping Proposed by the Southern Nevada Water Authority on the  
“Swamp Cedars” (*Juniperus scopulorum*) of Spring Valley, Nevada

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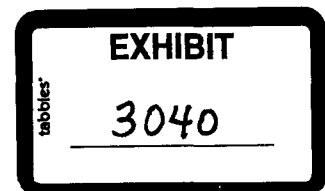
Spring Valley, Nevada is home to the largest of three populations of “Swamp Cedar”, the local name for these unique individuals of Rocky Mountain juniper (*Juniperus scopulorum*). These trees are unique because unlike any other members of this widespread species, they grow in valley bottom woodlands that are flooded part of the year, instead of the usual habitat of dry, rocky mountain slopes or somewhat shaded canyons.

In fact, within the borders of Nevada, Rocky Mountain juniper is found in 39 mountain ranges but in only one valley – Spring Valley. It is generally associated with pinyon pine (*Pinus monophylla*) woodlands and with curlleaf mountain-mahogany (*Cercocarpus ledifolius*). Outside Nevada, this juniper ranges from British Columbia and Alberta south through Washington, Oregon, Idaho, Wyoming, Utah, Montana Colorado, Arizona and New Mexico.

Of the 68 species of juniper scattered across the world, only one species, *Juniperus lucayana* of the Bahama Islands, grows in swamps, most occurring on limestone, sandstone or granite. For this reason, the swamp cedars should be considered an important example of biodiversity on a worldwide as well as a local scale.

Further, it is very likely that the swamp cedars comprise a distinct ecotype of Rocky Mountain juniper. An ecotype is a genetically differentiated population that has evolved in adaptation to a distinctively different environment than characterizes that of the main population of its species. Many ecotypes are recognized botanically as named varieties or subspecies. The swamp cedars of Spring Valley have not received extensive botanical or genetic study, due to their isolation, but almost certainly merit at least varietal recognition. The swamp cedars are found between 5500 and 6000 feet in Spring Valley, South Spring Valley, and east of Baking Powder Flat. Their understory includes greasewood and rabbitbrush. Their stands are not continuous with the scattered individuals of the nearby Snake Range.

The habitat of the swamp cedars is characterized by saline soils with an ample clay content, underlain by a hardpan. The wetness of the soils, flooded in the spring thaw, and the presence of the hardpan layer, result in very shallow root systems. Most coniferous trees that have been studied have about 90% of their root mass in the upper foot of soil, where there is better aeration, higher mineral concentration, and more access to summer rainstorm water. This is very likely to be true of the swamp cedars as well. The swamp cedar stands vary from open woodlands to small thickets. I have determined ages of at least 300 years, heights up to 40 feet, and trunk diameters up to 30 inches in one small group of trees I observed some years ago.



My observations of the swamp cedars have been in the context of my biological studies of Great Basin conifers beginning in the late 1960s. These studies have included looking for evidence of hybridization in nearby pinyon pine populations, and recording data on bristlecone pines in the nearby Snake Range. I have also taken student field trips from the Utah State University forestry program into the swamp cedar stands of Spring Valley. Some of my swamp cedar observations were mentioned in my 1984 book *Trees of the Great Basin, A Natural History* (University of Nevada Press).

Despite the fact that the swamp cedars are not currently considered at risk of extinction by state or federal authorities, they are extremely vulnerable to ground water pumping leading to lowering of the water table and loss of surface flooding. The granting of pumping permits would make it logical however, for such listing to be initiated.

It is my opinion that the effect of the proposed export of ground water from Spring Valley appears to be clear. Since the swamp cedar's root systems are concentrated in the upper one foot of soil, and almost entirely in the upper two feet, drawdown of water from this part of the soil profile can be expected to be devastating to the trees. I would expect trees to die within no more than two years following the pumping of water from their root zone, even if there is ample rainfall to keep surface roots alive. Within a short time this unique juniper ecotype, and the ecosystem based on it, will be gone.

Dated: June 20, 2006.



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