

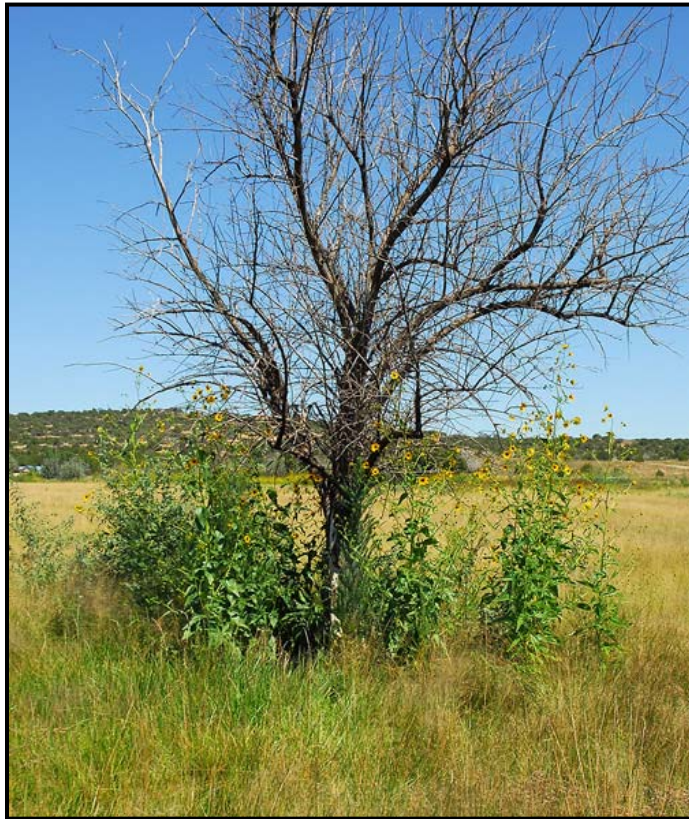


## Blue Hole Cienega

Blue Hole Cienega is a 116-acre wetland below Blue Hole Spring in Santa Rosa, Guadalupe County, New Mexico. Low-elevation, alkaline cienegas are created by spring seeps that saturate surface and subsurface soils over a large area supporting a lush wet meadow. Cienegas are probably the most rare and endangered ecosystems in the arid southwest. In 2005, the NM Energy, Minerals and Natural Resources Department – Forestry Division purchased Blue Hole Cienega with funding from the NM Department of Transportation and US Fish & Wildlife Service. This habitat is a nature preserve for a large population of the federally threatened Pecos sunflower, state-endangered Wright’s marsh thistle, and a few state-endangered Great Plains lady-tresses orchids. It is significantly threatened by dense stands of non-native Russian olive and salt cedar trees.

Forestry Division’s Inmate Work Crews from Los Lunas cut down and herbicide-treated all the invasive trees from December 2006 to September 2007. The entire cienega was burned with prescribed fire in December 2007 by fire crews from State Forestry Division, US Forest Service and City of Santa Rosa. Photographs by Bob Sivinski.





By September 2008 the distribution and density of Pecos sunflower at Blue Hole Cienega was visibly increased. Areas previously infested by Russian olive trees were showing new stands of sunflowers around stumps and under dead snags left standing. The bare ground and slightly elevated soil surface around dead tree stumps can be good habitats for this threatened species.

The following 'Before and After' photo points illustrate the restoration of the cienega with exotic tree removal and prescribed fire. However, numerous crown and root sprouts of Russian olive and salt cedar have become established in 2008 and will require continuous future treatments to protect the cienega from these exotic weeds.



August 2007.



September 2008. Largest Pecos sunflower (near center) is 9 feet tall.



August 2007



September 2008



September 2006



September 2008



September 2006



September 2008



Middle School students planting poles

In March 2008, State Forestry Division, NM Department of Transportation, and Santa Rosa Middle School students made an experimental pole planting effort of native trees along the drier margins of the cienega where 30-foot tall Russian olive trees had been removed. 205 poles of black willow and 40 poles of Rio Grande cottonwood were planted. The willows were expected to survive better than cottonwoods because the soil surface was only 12-14 inches above the groundwater level. Just the opposite occurred. By mid-summer, 80% of the black willows were dead or struggling to survive and 90% of the cottonwoods were still alive.

None of the surviving trees are especially vigorous. A natural cienega is an herbaceous wetland with no, or few, trees.



Rio Grande cottonwood poles planted on cienega margin.